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ANTHOCYANS OF GRAPE JUICE AND WINE

A Bibliography

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ANTHOCYANS OF GRAPE JUICE AND WINE

A Bibliography

While investigating the anthocyan content of grape juice and wines, the authors constantly referred to publications relative to the subject. Many of these reports were translated in their entirety from the French or the German original manuscripts. These translations were performed in order to better understand the problems which were being studied by other investigators in the field of pigment research and the methods developed to resolve these problems. It became apparent that an organized systematic listing of these reports and general bibliography of the anthocyans of grapes and wines would be helpful to any person engaged in research on these products.

In this bibliography are listed the journal articles, theses, books, etc., alphabetically by the first authors for each year of publication. Following the title of the listing are included the sources of abstracts, reviews, and references relative to this listing. An attempt has been made to briefly abstract or summarize the contents of each of the listings from the listings themselves, or from information available in other abstracts and summaries. Some abstracts and summaries have been taken in part or in their entirety from available sources either as the English or as translations into English; these have been enclosed in parentheses in most cases. All listing titles have been translated into English or have been listed as their English translation which was available in *Chemical Abstracts* or other sources. Journal titles are those listed in *Chemical Abstracts* unless otherwise indicated. An attempt has been made to standardize these listings by correcting obvious typographical errors which have been made in reporting bibliographical listings and through the use of journal titles found in *Chemical Abstracts* and other standard reference publications.

Several listings and journal titles are included from the *Internationale Weinbibliographie*. This publication became available to the authors after most of the compilation work was completed, and, in most cases, was used merely to provide more information as to the types of investigations undertaken by the various authors which had already been listed. The *Periodical Title* section of this publication was also of value in the determination of exact journal titles, and some of the listings are included in this bibliography.

It is realized that these listings do not constitute a complete bibliography of all reports which have been made regarding grape and wine anthocyanin research; however, it is hoped that such a presentation of the results of many weeks of library research will be of some value to other scientists who are, or who will be, engaged in research involving grape and wine pigmentation.

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Sadovodstvo Vinogradarstvo i Vinodelie Moldavii (Horticulture, Viticulture and Wine Making in Moldavia) (Moldavian SSR) (1961)

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Trudy Moldavskii Nauchno-Issledovatel'skii Instituta Pishchevoi Promyshlennosti (Transactions, Moldavian Scientific Research Institute for the Food Industry) (Title not listed as such in C.A.)

Trudy, Tsentral'nyi Nauchno-Issledovatel'skii Institut Pivovarennoi, Bezalkogol'noi i Vinnoi Promyshlennosti (Transactions of the Central Scientific Research Institute for Beer Brewing, Non-Alcoholic Beverages and Wine Industry) (1963)

Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Vinodeliya i Vinogradarstva (Transactions, the All-Union Scientific Research Institute of Viniculture and Viticulture) (1961)

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Zeitschrift fuer *Lebensm*ittel-*Untersuch*ung und *Forsch*ung (German) (1961)

Zuechter, Der (Berlin) (German with English summaries) (1961)

1952

Deibner, L.--Ann. Technol. Agr. 1, 345-357. "Current status of the direct dosage of the coloring substances of red grapes and red wines according to recent studies."

Russian methods (Durmishidze; Williams & Taranova; Durmishidze & Khatchidze; Tchogovadze) for the quantitation of red grape and red wine color and color components are described in detail; methods and the relative validity of results obtained are compared and discussed.

Durmishidze, S.V. and Khatchidze, O.T.--Vinodelie i Vinogradarstvo (USSR) 12(1), 18-20. "A photometric method for the determination of the coloring substances in grapes and wines" C.A. 49(2), 5769 C (1955).

A method for the photometric determination of total color, color due to aglucones (AmOH-extracted) and glycosides (Total color minus aglucone color) in wine is described. Total color was determined in grape and other plant extracts.

Ruf, W.--Z. Lebensm.-Unters.-Forsch. 94, 190-194. "On the use of paper chromatography for the detection of foreign pigments in wine" C.A. 46(2), 6318 I (1952).

The presence of blackberry, bilberry, elderberry, beet, vegetable Bordeaux and synthetic Bordeaux coloring substances in wine was detected by paper chromatography using water, ethanol, ethanol-water, and water saturated phenol as solvents.

Sastry, L.V.L. and Tischer, R.G.--Food Technol. 6, 82-86. "Behavior of anthocyanin pigments in Concord grapes during heat processing and storage" C.A. 46(3), 7673 C (1952).

Concord grapes in closed containers were processed at various temperatures and then were stored for various lengths of time. Changes in color were noted; exposure to light and air in the headspace were also variables.

Sastry, L.V.L. and Tischer, R.G.--Food Technol. 6, 264-268. "Stability of the anthocyanin pigments in Concord grape juice" C.A. 46(4), 11489 H (1952).

An analysis of Concord grape juice indicated aglucones along with mono- and diglucosides. Protection of anthocyans by tannins was indicated by exposing grape juice and purified pigment to UV light and subsequent measurements of optical densities.

Wobisch, R. and Schneyder, J.--Monatsh. Chem. 83, 478-481. "Colorimetric detection of elderberry pigment in wine" C.A. 47(3), 4966 E (1953).

Elderberry pigment in wine was detected photometrically by measurement of optical densities in glycine and borate buffers at pH 9.23 (with red filter). Dye containing vicinal OH groups (elderberry) formed red borate complexes.

1953

Begunova, R.D.--Tr. Vses. Nauchn. Issled. Inst. Vinodeliya i Vinogradarstva, "Magarach" 4, 169-174. "The accumulation of coloring substances during the period of ripening of grapes" C.A. 50(2), 5103 C (1956).

(Oenin increases in the flesh and oenidin in the skin of grapes as the fruit ripens. Both diminish in over-ripened fruits.)

Ribereau-Gayon, P.--Compt. Rend. Acad. Agric. (France) 39, 800-806. Progr. Agr. Vit. 141 380-385; 142, 18-19 (1954). "Differentiation of the coloring matters of grapes and wines of French varieties from those of hybrids" C.A. 48(2), 5431 I (1954).

Anthocyans contained in French and hybrid skin extracts were analyzed by use of one- and two-dimensional paper chromatography. Absence of diglucosides in French varieties and of aglucones in both varieties was shown.

Sadow, H.S.--Ph.D. Thesis (University of Connecticut) "The anthocyanin pigments of certain grapes and wines" C.A. 48(1), 4174 E (1954).

Anthocyans in Zinfandel wine were purified and concentrated by using lead ace-

tate precipitation technique and were then separated by column chromatography as described by Spaeth and Rosenblatt. (Stasunas Thesis, 1955).

Sadario, E.--Ann. Sper. Agrar. (Rome) 7, 157-163. "The coloring substances in grapes of direct-producing hybrids" (English summary) C.A. 47(2), 6503 G (1953).

A method for determining the methoxyl number of grape skin anthocyans is described. Tests on 18 varieties indicated that the methoxyl number of hybrid direct producer anthocyans is sensibly lower than that of anthocyans in European grapes.

1954

Ribereau-Gayon, J. and P.--Compt. Rend. 238, 2114-2116. "The separation of grape anthocyanins" C.A. 48(3), 11670 I (1954).

Anthocyans of French varieties (Merlot and Cabernet) and of hybrids (Seibel 7054 and 5455) were separated by 1-D and 2-D chromatographic techniques which are described. Techniques are also described for hydrolyzing pigment and chromatography of aglucones.

Ribereau-Gayon, J. and P.--Compt. Rend. 238, 2188-2191. "The identification of grape anthocyanins" C.A. 48(3), 11671 A (1954).

Anthocyans of French varieties and of hybrids were characterized by Rf-values, absorption spectra, fluorescence and aglucones. Percentages of variously glycosylated and methylated anthocyans were estimated visually on the resulting chromatograms.

Ribereau-Gayon, P.--Ann. Fals. Fraudes 47, 436-446. "A study of the coloring matters of red grapes as applied to the differentiation of varieties and of wines" C.A. 49(2), 7183 D (1955).

Three methods of differentiating grape varieties and wines are described: 1-D paper chromatography in acetic butanol, electrophoresis using Britton-Robinson buffer and 1-D chromatography using the Britton-Robinson buffer. Photometric recording of band color intensities is described.

1955

Amiel, J., Dupuy, P., and Nortz, M.--Compt. Rend. 240, 780-782. "Contribution to the study of a method of extracting polyphenolic compounds from certain Ampelideae" C.A. 49(3), 7804 H (1955).

Authors describe in detail an extraction and concentration of anthocyans from wine using neutral lead acetate for precipitation after adjustment of the pH to 9.0 with ammonia.

Bockian, A.H., Kepner, R.E., and Webb, A.D.--J.Agr. Food Chem. 3, 695-699. "Skin pigments of the Cabernet Sauvignon grape and related progeny" C.A. 50(1), 437 H (1956).

Anthocyans extracted from grape skins were purified and concentrated by precipitation with lead acetate at a low pH level. Pigments were separated by paper chromatography and were identified by described methods. The order of development of pigments during ripening was investigated.

Dupuy, P. and Puisais, J.--Compt. Rend. 240, 1802-1804. "Contribution to the study of chromatography of anthocyanin pigments of Vitaceae" C.A. 49(4), 12610 F (1955).

Authors obtained a better separation of monoglucosides from diglucosides using 15% HAc instead of BAW 4:1:5 as a chromatographic solvent. Chromatograms were sprayed with 5% ethanolic aluminum chloride before evaluation.

Durmishidze, S.V.--Academy of Science, Moscow (USSR). "Tannins and anthocyans of grapes and wines" (Book. 323 pages, with graphs, tables and chromatograms) English condensation by Paul Esau (Univ. Calif., Davis) in Am.J.Enol. Viticult. 10(1) 20-28 (1959). C.A. 53(2), 4450 D (1959).

(Summarizes research on the origin and transformation of tannins and anthocyans in the grape vine, and the subsequent fate of the compounds in wine). (Esau)

Ribereau-Gayon, P., Sudraud, P., and Durquety, P.M.--Rev. Gen. Botan. 62, 667-674. "Relations between genetics and the chemical nature of the anthocyanin pigments of the berry in Genus Vitis" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 7, 114 (1957).

Studies were made on 30 French varieties and more than 80 Franco-American varieties of grapes to establish a correlation between chemical composition of the coloring matter and genetic origin of the varieties.

Stasunas, V.J.--Ph.D. Thesis (University of Connecticut) "The anthocyan pigments of Zinfandel grapes and wine" C.A. 50(1), 527E (1956).

Pigments from Zinfandel grape skin extracts and Zinfandel wine were purified and concentrated by total precipitation with lead sub-acetate. Separation was effected using column chromatography (Spaeth & Rosenblatt) and identification techniques are described. Advantages of using lead sub-acetate instead of neutral lead acetate are described. Countercurrent distribution technique is described and is discussed.

Sudraud, P. and Puisais, J.--Ann. Fals. Fraudes 48, 51-66. "Comparison of the coloring matter of red wines from French and hybrid grape wine plants" C.A. 49(3), 8553 E (1955).

Wine pigmentation was analyzed by paper chromatography using Butanol:HAc:Water (4:1:5) as a solvent. French wines could be distinguished from hybrid wines with fair reliability. Electrophoretic data are presented.

Wobisch, F. and Schneyder, J.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 5, 49-52. "Determination of the color depth of red wine" C.A. 49(3), 7805 E (1955).

The optical densities of wines buffered to pH 3.30 were compared photometrically with that of a cobalt sulfate solution at 525 millimicrons wavelength.

1956

Berg, H.W. and Akiyoshi, M.--Am. J. Enol. 7, 84-90. "Effect of contact time of juice with pomace on the color and tannin content of red wines" C.A. 51(2), 3917 I (1957); B.A. 17123 (1957).

Instrumental measurements of wine color were made on samples taken during fermentation and during the aging period to determine the relationship of tannin content to total color content of wine. Data are presented graphically and are discussed.

Brito da Conseicao, M.A.--Bull. O.I.V. page 357. "Some considerations in the study of foreign anthocyans in red wine" Weinbibliographie 6189.

Fouassin, A.--Rev. Ferment, Ind. Aliment. 11, 173-192. "Chromatographic identification of anthocyanic pigments of fruits and vegetables" C.A. 51(1), 1500 C (1957).

Investigations of the pigmentation of 31 fruits (including V. vinifera grapes), 4 vegetables and 31 varieties of flowers by paper chromatography are described in detail.

Mareca, I. and Amo Gili, E. del--Anales Real Soc. Espan. Fis. Quim., Ser. B 52, 651-656. "Evolution of the coloring matter of Roija wines in the course of their aging. Communication I." C.A. 54(2), 5005 B (1960).

The color of wine samples was analyzed by column chromatography using aluminum oxide adjusted to pH 5.5 as a substrate. Blue and green zones were found only when fresh wines were tested.

Marichal, M.--Ann. Fals. Fraudes 49, 155-159. Progr. Agr. Vit. 146, 88-92. "Characterization of wines made from direct-producing hybrids by simplified chromatography" C.A. 53(5), 19290 H (1959); Mitt. (Klosterneuburg) Ser. A 7, 159-160(1957).

Pigments of wine were concentrated and purified by calcium chloride precipitation at a high pH and then were subjected to ascending paper chromatography using the Britton-Robinson buffer. Spots were evaluated under UV light.

Ribereau-Gayon, P.--Ann. Fals. Fraudes 49, 381-387 (No. 573-574). "Observations on the differentiation of the coloring matter of red wines" C.A. 54(5), 18870 I (1960); Mitt. (Klosterneuburg) Ser.A, Rebe Wein 7, 336 (1957).

Results of further studies on pigment differentiation are presented and discussed. Use of 0.1N citric acid as a possible solvent is mentioned.

1957

Berg, H.W. and Akiyoshi, M.--Food Res. 22(4), 373-383. "The effect of various must treatments on the color and tannin content of red grape juices" B.A. 89203 (1957).

Ten experiments were run in an attempt to determine the effect of carbon dioxide, fermentation, sulfur dioxide, alcohol and time on the color and tannin contents of grape juice. Data from instrumental measurements are presented graphically and are discussed.

Durquety, P.M.--Progr. Agr. Vit. 147, 309. "Note on the genetics of grape anthocyans" C.A. 51(5), 13088 A (1957).

Studies confirmed the presence of a glucosylation genetic factor; however, more data were needed to confirm the presence of an oxidation (delphinidin or cyanidin derivatives) genetic factor controlling the pigmentation of grapes.

Hennig, K. and Burkhardt, R.--Weinberg Keller 4, 374-387. "On the pigment, tannins and polyphenols and their transformations in wine" C.A. 52(1), 3252 A (1958); B.A. 27800 (1958).

Paper chromatographic and electrophoretic techniques for the separation and characterization of anthocyans in German wines are described.

Ribereau-Gayon, P. and Sudraud, P.--Compt. Rend. 244, 233-235. "Anthocyanins of the berry of Genus Vitis" C.A. 51(3), 7510 G (1957).

Pigments of 12 *Vitis* species were analyzed by a paper chromatographic band separation technique. Relative proportions of the anthocyans were calculated by planimetry of the absorption peaks.

Vescia, M.--Dissertation (Uni. Catt. del Sacro Cuore, Milan, Italy) "Extraction of red wine pigments and their identification by paper chromatography" (Italian) Weinbibliographie 6197.

1958

Bayer, E.--Vitis 1, 298-312. "Application of chromatographic methods to quality control of wine and musts" B.A. 24321 (1959).

Paper and gas chromatographic methods of wine analysis are described. Hybrid anthocyans were detected by use of circular paper chromatography.

Berg, H.W. and Akiyoshi, M.--Food Red. 23, 511-517. "Further studies of the factors affecting the extraction of color and tannin from red grapes" C.A. 54(1), 817 H (1960).

Further studies on the effect of processing variables on the color of grape juices were carried out photometrically.

Durmishidze, S.V. and Nutsubidze, N.O.--Soobshch. Akad, Nauk Gruz. S.S.R. 21(6), 677-684. "Anthocyanin grape pigments" C.A. 53(4), 14237 A (1959).

Paper chromatographic investigation of pigments in skins of European and European-American hybrid grapes. Percentages of various mono- and diglucosides in each type were determined. Effect of the locality on the amount and distribution of anthocyans was studied.

Durquety, P.M.--Qualitas Plant. Mater. Vegetabiles 3/4, 500. "The genetics of the anthocyans of grapes."

Fernandes, A.M.S. Silva--Relatorio final de curso de engenheiro agronomo (Instituto Superior de Agronomia, Lisbon, Portugal) "Anthocyanins of grapes and wines. Contribution to their study by paper chromatography."

Rankine, B.C., Kepner, R.E., and Webb, A.D. --Am. J. Enol. 9(3), 105-110. "Comparison of the anthocyan pigments of Vitis vinifera grapes. Communication I" C.A. 53(2), 6354 H (1959); B.A. 7419 (1959).

Pigment composition of 55 V. Vinifera samples of 42 known varieties was analyzed by one-dimensional paper chromatography. Rf values were measured and relative color intensities were estimated visually as between 0.1 and 45.0.

Raudnitz, H.--Science 128, 782. "Concerning a pigment commonly attributed to the presence of leuco-anthocyanin" C.A. 53(2), 5424 I (1959).

Humic acid from plants yielded, on hydro-

drolysis, a pigment similar to anthrocyanin but differing in its optical density curve and color in the alkaline.

Ribereau-Gayon, J. and Peynaud, E.--"Analyse et Controle des Vins" Lib. rairie Polytechnique Ch. Beranger, Paris. Ann. Technol. Agr. 8, 113-116 (1959).

Authors present methods which they have used with success, describe the chemistry involved so that results can be better understood and interpreted, and describe methods for adulteration research along with the current status of the legislation pertaining to adulteration.

Ribereau-Gayon, J. and P.--Am. J. Enol. 9(1), 1-9. "Anthocyanins and leucoanthocyanins of grapes and wines" C.A. 52(6), 20874 E (1958).

Results of their recent studies on anthocyans and leucoanthocyans of grapes and wines are presented and discussed. Paper chromatographic analysis techniques for anthocyans of grapes and wines are described in detail.

Ribereau-Gayon, P.--Compt. Rend. 246, 1271-1273. "Formation and evolution of the anthocyans during the ripening of grapes" C.A. 52(4), 12106 E (1958).

Formation of delphinidin) from cyanidin and subsequent methylation into petunidin and malvidin are described and factors influencing the extent of methylation are discussed.

Ribereau-Gayon, P.--Qualitas Plant. Mater. Vegetabiles 3/4, 491-499. "The anthocyans of grapes" C.A. 53(2), 6363 I (1959).

Recent studies of grape anthocyans by paper chromatography are presented and discussed; results obtained are compared with results obtainable using chemical methods.

Sudraud, P.--Ann. Technol. Agr. 7, 203-208. "Interpretation of the absorption curves of red wines."

Observations were made on the effect of type of vinification, pH and varieties of grapes on the absorption curves of wines.

1959

Albach, R.F., Kepner, R.E., and Webb, A.D. --Am. J. Enol. Viticult. 10(4), 164-172. "Comparison of the anthocyan pigments of red Vinifera grapes. Communication II" C.A. 54(3), 11167 B (1960).

Pigment composition of 125 additional varieties of red and black V. vinifera grapes was determined by the use of ascending paper chromatography. Band intensities were measured using an Analytrol.

Gilbert, E.--Angew. Chem. 71(13), 433. "Detection of red hybrid pigment in wine" B.A. 7053 (1960).

Grohmann, H. and Gilbert, E.--Deut. Wein-Ztg. 95, Wein Rebe 40, 346-348. "On the paper chromatographic detection of hybrid pigments" C.A. 58(1), 1883 D (1963).

Paper chromatographic detection of malvin in wines per se or in extracts obtained by calcium chloride precipitation is described.

Mareca, I. and Amo Gili, E. del--Ind. Aliment. Agr. (Paris) 76, 601-606. "Evolution of the coloring matter of Roija wines in the course of their aging. Communication II" C.A. 54(1), 2653 E (1960).

Optical densities of wine dilutions were measured using 440 and 524 millimicron wavelength Corning filters and results are discussed. Separation of wine acids on the aluminum oxide column is also discussed.

Rentschler, H.--Mitt. Gebiete Lebensm. Hyg. 50, 533-540. "Detection of hybrid wine in wine made from V. vinifera grapes" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 10, 169 (1960).

Description of a paper chromatographic band technique for malvin detection using wine per se or extracts obtained by adsorption on charcoal followed by elution with alcoholic formic acid.

Ribereau-Gayon, P.--Rev. Gen. Botan. 66, 531-635. Thesis, Docteur es Sciences Physiques, University of Bordeaux, France. Librairie Generale de L'Enseignement, Rue Dante, Paris. "Investigations of the plant anthocyans; practical application to Genus Vitis"

Anthocyan chemistry, separation and identification techniques and the results

of studies made in the Bordeaux laboratories and elsewhere are presented and discussed.

Samvelyan, A.M.--Vinodelie i Vinogradarstvo SSSR 19(4), 6-8. "Changes in the colored substances during the aging of wine" C.A. 54(2), 7968 I (1960).

Author observed the conversion of aglucones into glucosides and of leuco forms into colored forms during the aging of wines.

Schneyder, J. and Epp, F.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 9, 111-114. "Paper chromatographic separation of pigment components of red wines, direct-bearing red wines and fermented berry juices" C.A. 55(1), 2011 A (1961).

Authors found that adulteration of European grape wine with hybrid wine or berry wine could not be detected by the reaction of borate buffer with the pigment of bands separated by paper chromatography using acetic butanol (4:1:5) as a solvent.

Villforth, F.--Wein-Wiss. 1-8 and 11-14. "Color value and color analysis of red wine" C.A. 53(5), 16463 A (1959).

Author proposes assignment of a color value based on the absorption of 1 mm. red wine using Zeiss filter 538E. Percentages of light transmission were measured using blue, green, yellow, and red filters, values were used to characterize red wines.

Zakow, D.--Lozarstvo Vinarstvo (Sofia) 8(1), 36-40. "The coloring matter in the grape and wine of some red varieties" B.A. 24(1). 1718 (1960).

1960

Albach, R.F.--Master of Science Thesis (University of California, Davis). "Anthocyan pigments in Vitis vinifera grapes"

Bieber, H.--Deut. Wein-Ztg. 96, 104-106. "The paper chromatographic detection of red hybrid pigment"

Cappelleri, G.--Riv. Viticolt. Enol. 13(10), 343-348. "On the possibility of revealing the presence of (direct) producing hybrids in wine" Z. Lebensm. -Untersuch. -Forsch. 116, 257 (1962).

The author investigated the possibility of detection and quantitation of malvin in hybrid wines and wine blends by isolation and concentration of the anthocyanins by the Mathers method (calcium chloride precipitation) and chromatography of the obtained extract on Whatman No. 1 paper using the Britton-Robinson solvent. Resolved dye streaks were evaluated under UV light.

Colagrande, O. and Grande, G.--Ann. Sper. Agrar. (Rome) 14, 325-335. "A contribution to the knowledge of anthocyanin pigments of grapes" C.A. 54(6), 25060 C (1960); Am. J. Enol. Viticult. 13(2), 96 (1962); Proc. Plant Phenolics Group Symp. No. 4 (July 23-24, 1964) 31-32.

Analyses of pigments of Bonardo, Barbera, Fruttano, Alicante and Isabella grape skin extracts and identification of the pigments are described. Separations were made by one- and two-dimensional paper chromatographic techniques; characterization was effected by paper chromatography and other laboratory methods.

Deibner, L. and Bourzeix, M.--Compt. Rend. Acad. Agric. France 46, 968. "On the uncertainties in the differentiation of 'Vitis vinifera' varieties and red hybrids by paper chromatography of their coloring substances" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 11, 345 (1961).

Authors point out that some V. vinifera grapes and certain interspecific crossings grown under certain cultural conditions have been found to contain small amounts of malvin; therefore, any improved paper chromatographic method which detects small amounts of malvin cannot be safely used for the screening of V. vinifera wine blends containing wine made from direct-producing hybrid grapes.

Drawert, F.--Vitis 2, 179-180. "A method for chromatography of anthocyanins, especially the anthocyanins of hybrids in red musts and red wines" C.A. 54(5), 17788 B (1960).

Red wine pigments were precipitated and purified by use of saturated lead acetate solution. Extracts were separated into components by paper chromatography in n-Propanol:n-Butanol: 5% Boric Acid (1:1:1) solution. Chromatograms were

evaluated under UV light; spraying with an aluminum ammonium sulfate solution is recommended.

Enachescu, G. and Alexiu, A.--Acad. Rep. Populare Romine, Studii Cercetari Biochemie 3, 269-280 (1960). "Anthocyanin pigments of the grapes and red wines of the R.P.R. by paper chromatography" C.A. 55(3), 8752 I (1961).

Paper chromatographic investigations of the pigmentation of the main grapes (V. vinifera, grafted Roumanian hybrids and hybrids of recognized parental stocks) as well as the wines made from these grapes; results are presented and discussed.

Gentilini, L.--Riv. Viticolt. Enol. page 298. "New knowledge concerning the anthocyans of grapes" Weinbibliographie 6221.

Hennig, K., Burkhardt, R., and Lay, A.--Hessische Lehr- und Forschungsanstalt fuer Wein-, Obst- und Gartenbau, Geisenheim (Rheingau). Berichte fuer das Rechnungsjahr 1959/1960. Pages 21-22. "Detection of hybrid wine" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 11, 213-214 (1961).

Authors recommend two-dimensional paper chromatography for the detection of malvin in wine blends. Solvents are listed and spraying with methanolic aluminum chloride is recommended.

Jaulmes, P. and Ney--Ann. Fals. Expert. Chim. 53, 180-183 (616). "Studies of red hybrid wines by chromatography of the pigments" B.A. 69590 (1960); Mitt. (Klosterneuburg) Ser. A, 11, 269 (1961).

Fluorescent components in hybrid wines were studied by paper chromatography of wines spotted per se and developed in the Britton-Robinson buffer. The intensity of coloration was estimated by comparison with a standard scale of Pinacyanol spots obtained under the same chromatographic conditions.

Kuttelvaser, Z.--Kvasny Prumysl 6, 133-137. "Coloring matter in grapes and its changes during wine production" C.A. 54(6), 25550 I (1960).

(A discussion)

Ponting, J.D., Sanshuck, D.W., and Brekke, J.E.--Food Res. 25, 471-478. "Color measurement and deterioration in grape and berry juices and concentrates" Z. Lebensm. -Untersuch. -Forsch. 115, 288 (1961).

Studies were made on evaluation of color and color changes of V. vinifera hot-press juice, boysenberry pressed juice and strawberry pressed juice during processing and storage. Measurements were made on the Hunter Color Difference meter, Cary Model 14 Recording Spectrophotometer, and Beckman Model DU Spectrophotometer. Samples were exposed to various temperatures for various lengths of time.

Reuther, G.--Z. Lebensm. -Untersuch. -Forsch. 113, 480-484. "Investigations on the detection of red hybrids in juices and wines (Extension of the Ribereau-Gayon method)" C.A. 55(2), 5860 F (1961).

Author discusses studies made by P. Ribereau-Gayon and proposes the use of a butanol extract of wine for the paper chromatographic detection of hybrids. Two-dimensional chromatography, thin-layer chromatography and spraying of chromatograms with methanolic aluminum chloride solution or Benedict's Reagent are included in the author's proposed method.

Ribereau-Gayon, P.--Compt. Rend. 250(1), 591-593. "The Anthocyans of Genus Vitis; practical application to the differentiation of wines" C.A. 54(4), 15824 H (1960).

The occurrence and transmission of "hybrid" characters in various species of Vitis are discussed and the author discusses his method of hybrid detection by paper chromatography using 0.6% Citric Acid as a solvent.

Ribereau--Gayon, P.--Deut. Lebens.-Rundschau 56, 217-223. "Research on the pigments of red grapes" C.A. 55(1), 2821 E (1961).

Author presents the essential results of his studies of grape pigmentation and describes his method for the detection of hybrids in wine. Studies of color formation in grapes during ripening are discussed.

Ribereau-Gayon, P.--Bull. I.N.A.O. 74, 28-31. "The anthocyans of Genus Vitis;

application to the differentiation of wines; Chromatography and hybrids" B.A. 23818 (1961)

Suomalainen, H. and Eriksson, C.--Z. Lebensm. -Untersuch. -Forsch. 112, 197-212. "Comprehensive review. Anthocyanins in northern and in some other berry fruits" C.A. 54(4), 15750 I (1960).

A review of the anthocyanic content of various fruits (berries), including grape varieties, as determined by various investigators.

Tanner, H. and Rentschler, H.--Mitt. Gebiete Lebensm. Hyg. 51, 130-131. "Supplement to Communication I (1959). Communication II." B.A. 15240 (1961); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 11, 329 (1961).

A modification of the activated charcoal adsorption technique is described. Elution was with alcoholic ammonia solution and phosphoric acid was used for acidification prior to paper chromatography. Techniques are recommended for testing of highly-colored, medium-colored, and poorly-colored wines.

Zakow, D.--Lozarstvo Vinarstvo (Sofia) 9(3), 27-30. "Dynamics of tannins and pigments during the ripening of grapes, varieties Gamza and Zarchin" C.A. 61(1), 4701 D (1964); Z. Lebensm. -Untersuch. -Forsch. 116, 201 (1962).

Author found that the water-soluble tannin in grape flesh and seeds is of maximum quantity at maturity and then decreases; that of skins is maximum just after maturity. Pigment consisted of malvidin and oenin, Gamza having a higher weight percentage of pigment than Zarchin. Zarchin contained more tannin than Gamza variety.

Zakow, D. et al.--Lozarstvo Vinarstvo (Sofia) 9(5), 32. "Methods for the determination of the color density and the pigments of wine" Weinbibliographie 6217.

1961

Anonymous--Bundesgesundh. -Blatt 4(2), 26 (2427) (Jan. 27, 1961). "Detection of red hybrid wines and musts" Weinberg Keller 8, 242 (1961).

The need for an acceptable hybrid-detection method and basic principles of hybrid-detection are discussed. The advantages of the newly proposed German method over other existing methods are listed.

Anonymous--Bundesgesundh. -Blatt 4(2), 27 (Jan. 27, 1961). "Paper chromatographic detection of red hybrid pigment" Weinberg Keller 8, 242-245 (1961).

A detailed description of the newly proposed German method for the detection and quantitation of hybrid pigment in grape juice and wine.

Bergeret, J.--Bull. Soc. Chim. France 844-847. "On the separation of anthocyanic pigments of wines by circular paper chromatography" C.A. 55(5), 16905 H (1961).

A circular chromatographic technique for the resolution of wine pigment into color components is described in detail. Wine was applied to paper per se or an extract obtained by calcium chloride precipitation was used. Evaluation and photography of the resulting chromatograms are discussed.

Biol, H. and Foulonneau, C.--Ann. Technol. Agr. 10(4), 345-350. "Peonidin 3,5-diglucoside in Genus Vitis" C.A. 57(4), 13015 C (1962).

Authors found that certain V. vinifera wine contained peonidin diglucoside and acylated peonidin diglucoside; corresponding malvidin glucosides were not found to be present. The Diemair-Sengewald concentration and purification techniques were used.

Biol, H. and Michel, A.--Ann. Technol. Agr. 10(4), 319-324. "Paper chromatography of the coloring matter of red wines" C.A. 57(3), 11672 A (1962).

Authors discuss chromatography and evaluation of the fluorescence using officially recommended methods. The results of their studies are presented.

Biol, H. and Michel, A.--Ann. Technol. Agr. 10(4), 325-337. "Chromatographic techniques applied to the differentiation of the coloring matter of red wines" C.A. 57(3), 11672 B (1962).

Results of studies of different techniques for the detection of hybrid wine are presented; methods are criticized and

recommended techniques are presented. Studies of black-and-white and color photography of chromatograms are described in detail.

Biol, H. and Michel, A.--Ann. Technol. Agr. 10(4), 339-344. "A chromatographic study of red wines made from regulation varieties" C.A. 57(3), 11672 B (1962).

Wines made from 96 samples of regulation varieties of V. vinifera were tested using one- and two-dimensional paper chromatography; they were found to be free of malvin. Regulation and experimental hybrid varieties were also tested.

Branas, J.--Progr. Agr. Vit. 156, 122-129, 169-171. "The pigments."

A brief discussion of pigment chemistry, biosynthesis, occurrence in ripe grapes and in grape leaves, distribution in various species and analysis for malvin content. Written from the viticultural point of view for non-specialists to use for answering questions and rendering opinions.

Coux, C., Vitte, G., and Faucounau, L.--Bull. Soc. Phar. Bordeaux 100, 3-5. "Investigation of wines prepared from hybrids" C.A. 61(2), 8860 G (1964).

A diglucoside detection method which is based on the Ribereau-Gayon method, modified so as to use a diglucoside-rich fraction from a chromatographic column, is described in detail.

Drawert, F.--Vitis 2, 288-304. "On the anthocyanins in grapes, musts and wines. (Methods for the concentration and separation of dye components)" Z. Lebensm. -Untersuch. -Forsch. 119, 188 (1963); B.A. 80235 (1961).

Paper chromatographic techniques and methods of pigment extraction and concentration are described and criticized. Precipitation of pigment from wine adjusted to pH 7.2 using basic lead acetate is recommended. Details and results of personal studies are presented.

Enachescu, G et al.--Gradina, Via Livada 1961(2), 34. "Analysis of red wine pigments by the use of paper chromatography" Weinbibliographie 6233.

Feduchy, E., Sandoval, J.A., and Hidalgo, T. --Bol. Inst. Nac. Invest. Agron. B21(45), 303-335. "Study of chromatographic methods for investigating the use of 'hybrids' in wine making" C.A. 61(1), 3652 G (1964); Bull. O.I.V. 35, 1100 (1962).

Proposed international methods for hybrid detection were tested and data are discussed. The study was made so that an acceptable method could be used for the evaluation of local varieties.

Giordano, M.T.--Ital. Vinicola Agrar. 51, 267-271. "Detection of hybrid grape wines" C.A. 56(3), 10711 B (1962).

(A comparison was made between two analytical methods proposed for detecting malvin, the diglucoside which characterizes the coloring matter of hybrids. Natural wines from Italian grapes did not contain malvin.)

Harvalia, A.--Chim. Chronika (Athens) 26A, 180-187. "Detection of hybrid wines with paper chromatography" C.A. 56(4), 15962 I (1962); Bull. O.I.V. 35, 560 (1962).

A study of malvin detection in dry and sweet wines by ascending paper chromatography; V. vinifera wine with added malvin was used for comparison standards. Sweet wines were treated with 15g ammonium sulfate and 7 ml. ethanol per 25 ml. wine for sugar removal prior to the chromatography.

Kain, W.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 11, 194-202. "Concentration of the red pigments of direct bearing grapes by means of fractional lead precipitation" C.A. 56(1), 3916 (1962).

A type of fractional lead acetate precipitation of the pigment from red wines is described. The "Drawert" method was modified by portionwise addition of lead acetate solution, the first precipitate being discarded.

Kalasek, J.--Sb. Cesk. Akad. Zemedel. Ved, Rostlinna Vyroba 7(6), 913-920. "Contribution to the identification of wines made from hybrid grapes" B.A. 92661 (1961).

Rentschler, H., Tanner, H., and Brunner, M. --Mitt. Gebiete Lebensm. Hyg. 52, 312-320. "On the identification of anthocyan dyes characteristic of hybrid grape

juices and wines" C.A. 56(3). 12046 B (1962).

Methods of concentration and purification of red wine pigments are presented and criticized. Discarding of the low-pH neutral lead acetate precipitate and use of the precipitate obtained after addition of ammonia is recommended. This procedure and the subsequent chromatography are described in detail.

Reuther, G.--Zuechter 31, 319-328. "Genetic-biochemical investigations on species of grape hybrids" C.A. 58(2), 4812 G (1963).

Skin pigments of V. vinifera-V. Riparia crossings were extracted and analyzed paper chromatographically by the Reuther (modified Ribereau-Gayon) technique for monoglucoside and diglucoside content. Data were analyzed and the mode of inheritance of various diglucosides is discussed in view of these findings.

Ribereau-Gayon, J. and Peynaud, E.--"Traite d'Oenologie; composition, transformation et traitments des vins" Librairie Polytechnique Ch. Beranger, 15 Rue des Saints-Peres, Paris. Bull. O.I.V. 35, 142-143 (1962).

The second volume in a series dealing primarily with the chemical composition of wines. Chapter XII of Part II describes results of studies made on the maturation and aging of wines and the use of sulfur dioxide.

Rudnev, N.M. and Leonov, B.I.--Sadovodstvo Vinogradarstvo i Vinodelie Moldavii 16(9), 38-41. "Grape pigments, their chemical constitution and method of extraction" C.A. 56(4), 15901 I (1962).

Preparation of commercial food material coloring by extraction of wine press residue with 1% HCL (12-20 hours at room temperature; 50-60 minutes at 65-70 deg. C) is described. A continuous extraction apparatus for industrial application is described.

Samvelyan, A.M.--Izv. Sel'skoknoz. Nauki, Min. Sel'sk. Khoz. Arm.S.S.R. 1961(6), 73-76. "Composition of pigments of grapes grown in Armenia" (Armenian) B.A. 88221 (1962).

Sengewald, H.--Disseruation, Univ., Frankfurt a.M., Germany. "Investigations of the anthocyans, especially of malvidin diglucoside. Contribution to the knowledge of the chromatography, extraction and properties of the anthocyans." Reference: Diemair; Postel; Sengewald (1963).

Shijo, N., Amemiya, S., and Muraki, H.--Bull. Res. Inst. Ferment., Yamanashi Univ. 8, 83-92. "Polyphenolic constituents in Wine. I. Extraction of polyphenols into wine during fermentation from grape skins" C.A. 59(3), 10737 E (1963).

The elution of pigment from Muscat Bailey A grape skins during fermentation with and without addition of sulfur dioxide was investigated spectrophotometrically; data are evaluated and interpreted.

Singleton, V.L.--Am. J. Enol. Viticult. 12(1), 1-8. "An extraction technique for the recovery of flavors, pigments, and other constituents from wines and other aqueous solutions" C.A. 55(4), 13760 D (1961).

Various salts were tested for effectiveness in salting out desired components from aqueous-alcoholic solutions; ammonium sulfate was found to be most effective. Data are presented in text and graphic forms and are discussed.

Tanner, H.--Weinberg Keller 8, 314. "Modern wine control in the laboratory and in industry. Part 8: Detection of hybrids"

Author briefly summarizes work reported out (Rentschler; Tanner; Brunner - 1961) on the detection of diglucoside pigment in wine blends and recommends this method for use in wine-testing laboratories.

Tirdea, C., Cruceanu, M., Busuioc, Gh., and Ifrim, S.--Comun. Acad. Rep. Populare Romine 11, 1257-1263. "Anthocyanic substances in grape vines" C.A. 56(4), 15963 A (1962).

(Wine color is dependent on the presence and quantity of anthocyanic substances in grapes. An absorption spectrometric method was used to follow the maturing of grapes by determining the presence of anthocyanic substances in three varieties.)

Weger, B.--Weinberg Keller 8, 317-321. "Can hybrid wines be made analysis-fast?" B.A. 30436 (1962).

Studies made on decolorizing blending wines and wine blends with charcoal, ion-exchange resins and bentonite showed that color remained which could be detected by the Diemair-Bieber method. Heat treatment of wine was likewise of no value in masking the presence of diglucosides.

Weger, B.--Riv. Viticolt. Enol. 14(12), 421-424. "A very sensitive new method for revealing the presence of direct-producing hybrids" Reference: Riv. Viticolt. Enol. 16, 385 (1963).

1962

Alexiu, A.--Lucr. Stiint., Inst. Cerc. Horti-vitic. 4, 483-490. (Roumanian with French Summary) "The absorption curves of red wines" B.A. 28(1), 24599 (1964).

Benk, Erich--Gordian (Hamburg) page 20. "Composition and evaluation of the pigment compounds of grapes" Weinbibliographie 6248.

Berg, H.W. and Akoyoshi, M.--Am. J. Enol. Viticult. 13(3), 126-132. "Behavior of the color during the fermentation and aging of wines" C.A. 57(4), 17205 E (1962).

Studies of colored pigments and colorless pigments (anthocyanogens) in wine were made quantitatively. Vinification and aging variables were introduced and observations are presented graphically and discussed.

Blaha, J.--Kvasny Prumysl Page 281. "Detection of hybrid wine in grape wine blends" Weinbibliographie 7024.

Boubals, D., Cordonnier, R., and Pistre, R. --Progr. Agr. Vit. 157, 187-192. "Study of the hereditary mode of transmission of the character 'anthocyanic diglucosides in grapes' in Genus Vitis" Bull. O.I.V. 35, 681-684 (1962).

Authors made paper chromatographic investigations of skin pigments of crosses of V. vinifera varieties with S.V. 23-18, S.V. 18-402 and S.V. 23-353 in an effort to determine the mode of transmission of the "presence of diglucoside" character in Genus Vitis. Conclusions were that this characteristic is determined by one gene and is dominant over "absence of diglucosides."

Garoglio, P.G.--Riv. Viticolt. Enol. 15, 187-199. "On the detection of hybrid pigments by proposed new methods and other wine chemistry of topical interest" Weinberg Keller 9, 422 (1962); Bull. O.I.V. 35, 1123 (1962); Z. Lebensm. -Untersuch. -Forsch. 119, 440 (1963); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 13, 313 (1963).

Author describes methods of hybrid detection proposed by Reuther, Harvalia, Biol-Foulonneau and Diemair-Sengewald-Bieber; he points out that oversensitivity of methods and spots appearing at about the same position as malvin on paper chromatograms have led to confusion in the interpretation of results.

Korablev, A.I. and Trofimenko, B.S.--Sadovodstvo Vinogradarstvo i Vinodelie Moldavii 1962(1), 37-40. "Determination of tannins and pigments in dry wines" B.A. 26(2), 74606 (1962).

Kushida, T., Maruyama, C., and Sato, Kesako --Bull. Res. Inst. Ferment., Yamanashi Univ. 9, 43. (Japanese with summary) "Enological studies on the color of red wines. IV. The effects of temperature during fermentation and storage on the color development" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 13(5), 249 (1963).

Authors investigated O.D., chemical data and taste of various red wines prepared at various fermentation and storage temperatures after 10 months of storage. They found that color was more intense at fermentation temperatures of 25 deg. C than at temperatures of 15 and 30 deg. C. Wine fermented at 24-30 deg. C and stored at 25-30 deg. C was of higher quality than the same wine stored at 10-15 deg. C.

Kushida, T., Maruyama, C., and Sato, Kesako --Bull. Res. Inst. Ferment., Yamanashi Univ. 9, 51. (Japanese with summary) "Enological studies on the color of red wines. V. The effects of sulfur dioxide on the depth of color" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 13 (5), 248 (1963).

The O.D. of four different red wines prepared from the variety Muscat Bailey A, to which different amounts of sulfur dioxide (0-400 ppm) had been added, were measured during the fermentation and

throughout 10 months of storage in bottles. It was found that the best quality wines were obtained by addition of 100-200 ppm of sulfur dioxide.

Maiorov, V.S. and Begunova, R.D.--Moscow: Izd. Tsentr. Inst. Nauchn.-Tekh. Inform. Pishchevoi Prom. Gos. Kom. Sov. Min. SSSR po Koordinats. Nauchn.-Issled. Robot. "Use of waste products in wine making for the production of natural dyes" Book, 28 pages (Russian). C.A. 58(2), 6954 H (1963).

Mareca, I. et al (Amo Gili, E.)--Publ. Inst. Quim. "Alonso Barba" (Madrid) 18, IX. "Evolution of the coloring matter of Roija wines during the course of their aging" Weinbibliographie 6235.

Mareca, I. and Diez de Bethencourt, C.--Chim. Anal. 44(12), 527-532. "On the coloring materials and acids of wine" C.A. 58(2), 7334 C (1963).

(Spectrophotometric measurements are used to show the effects of aging on color and pH for wines stored up to 4 years).

Michod, J. and Ramuz, A.--Agr. Romande 1, 72-73. "Detection of hybrid dyes in wines from noble grapes in Switzerland" B.A. 54235 (1963).

Four methods of hybrid detection (Ribereau-Gayon, Rentschler, Jaulmes-Ney and Rieber) were tested. That of Rieber was found to be most sensitive and was used for testing wines before shipment to Germany.

Navara, A., Cepec, J., Veselsky, J., and Pesko, A.--Pokroky Vinohradnickom Vinarskom Vyskume 223-245. "Chemical indexes during ripening of some varieties in the vine district of Male Karpaty (Little Carpathes)" C.A. 61(1), 4704 B (1964).

The biochemical process of ripening of some varieties of grapes was studied and the contents of sugars, acids, amino acids, and pigments were determined. The red pigments in blue varieties belong to the group of anthocyans combined with monoglucosides or to the free anthocyans. With the aid of paper chromatography 11 pigments were separated.

Pataky, B.--Kiserl, Kozlemen., C. Kertesz. 55(2), 101-110. "Color determination in viniculture" (Hungarian with English Summary) B.A. 64965 (1963).

Pataky, B.--Dissertation (Budapest) (Hungarian) "Red wine color determination and other studies relating to wine color" Weinbibliographie 6244.

Pifferi, P.G. and Pavolini, T.--Riv. Viticolt. Enol. 15, 393-406. "Chromatographic determination of anthocyanins of Venetia wines" C.A. 60(1), 2299 H (1964); Bull. O.I.V. 36, 115 (1963); Mitt. (Klosterneuburg) Ser. A. Rebe Wein 13(5), 276 (1963).

Studies indicate that it is possible to differentiate hybrid (Clinton, Baco) and V. vinifera (Raboso, Merlot) wines by the presence of fluorescent pigments (malvin, peonin) in the former and only non-fluorescent 3-glucosides in the latter.

Ribereau-Gayon, J.--Vinos vinas y frutas (Buenos Aires) 681, 459. "On the chemical differentiation of the hybrid wines. Part I" Weinbibliographie 7022.

Samvelyan, A.M.--Vinodelie i Vinogradarstvo SSSR 1962(6), 6-7. "Obtaining red wines with intense color" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 13(5), 265 (1963); B.A. 15081 (1963).

Authors found that the color intensity of red wines could be intensified by the addition of citric acid or tartaric acid directly to the grape mash. Citric acid was found to be more effective for grapes grown in southern USSR. (Acid addition is legal in the USSR).

Schneyder, J.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 12(3), 131. "Simple device for measuring the depth of color of red wines."

Measurement of the color depth of red wine by use of a simple, portable color comparison device is described. Wine was added portionwise to buffer solution until the sample was visually the same color as a comparison solution of cobalt sulfate. Samples were viewed from above, a monochromatic filter was built into the base of the cells and slanted mirrors were used for directing light into the cells.

Singleton, V.L. and Draper, D.E.--Am. J. Enol. Viticult. 13(3), 114-125. "Ad-

sorbants and wines. I. Selection of activated charcoals for treatment of wine" C.A. 57(4), 17205 C (1962).

A chromatographic frontal analysis technique is described for estimating the relative abilities of charcoals to adsorb various colors, flavors or odors from wine. The relative specific retention volumes of 41 different charcoals were determined.

Valuiko, G.G.--Sadovodstvo Vinogradarstvo i Vinodelie Moldavii 1962(5), 31-33. "How to distinguish wines made from grape hybrids from wine made from European varieties" (Russian) B.A. 26(2), 83705 (1962).

Zakow, D.--Lozarstvo Vinarstvo ((Sofia) 11(6), 27-32. "The tannins and pigments in wine grapes and their changes in the wine" C.A. 59(1), 2131 C (1963); Vitis 4, 85 and 121 (1964).

(The tannins are mainly found in the seeds, and the dyes in the skin. During fermentation, the tannins and dyes are transferred into the wine and also change form.)

1963

Akiyoshi, M., Webb, A.D., and Kepner, R.E. --J. Food Sci. 28(2), 177-181. "The major anthocyanin pigments of V. vinifera varieties Flame Tokay, Emperor, and Red Malaga" C.A. 60(3), 11051 D (1964).

Skin pigments of Flame Tokay, Emperor, and Red Malaga grapes were extracted, separated by paper chromatography and the principal pigments were identified. Relative pigment concentrations were determined from bar chromatograms by use of the Analytrol.

Albach, R.F., Kepner, R.E., and Webb, A.D.-- J. Food Sci. 28(1), 55-58. "Peonidin 3-monoglucoside in Vinifera grapes" C.A. 60(4), 13800 C (1964).

Skin pigments of Freisa grapes were extracted, separated and purified by paper chromatography and the principal pigment was identified as peonidin 3-monoglucoside.

Anonymous--Bundesgesundh.-Blatt 1963(8), 125. "German method for the demonstration of hybrid pigments (Malvidin Diglucoside)." Reference: Diemair; Postel; Sengewald (1963). Complete text of method included in Diemair; Postel; Sengewald (1963).

A method is described for the detection of malvin in wines and grape juice using circular paper chromatography with BAW 6:2:3 as a solvent. Malvin was identified by the Rf value (compared to a Malvin reference standard) and by the fluorescence under UV light. A diglucoside-rich and purified extract was obtained by liberation of pigment from the high-pH fraction of the lead acetate precipitates.

Anonymous--Bol. Inst. Nac. Invest. Agron. 23, 289. "Contribution to the study of direct-producing hybrids" Weinbibliographie 7028.

Berg, H. W.--Symp. Intern. d'Oenol., Bordeaux, June 1963. Ann. Technol. Agr. 12, no. hors serie I 247-259. "Stabilization of the anthocyans. Behavior of the color in the red wines" C.A. 61(1), 4921 E (1964).

Author determined the rate of color extraction during must fermentation and studied color changes which occurred during an aging period of 18 months. Association of the pigments, as indicated by their spectral response to pH change being different from that of pure pigments, was considered as one of the factors responsible for the varying susceptibility of wines to oxidation.

Bieber, H.--Weinblatt 57, 832-836. "Problems in the detection of red hybrid pigment" Vitis 4, 218 (1964).

Biol, H. and Foulonneau, Ch.--Ann. Technol. Agr. 12(1), 27-38. "Decolorization of red wines by certain salts of heavy metals" C.A. 59(4), 13314 E (1963).

Precipitation of anthocyanins, especially malvin and peonin, by mercuric sulfate, lead acetate and zinc acetate in alkaline media was studied. Red wines and peony extract were used for this study; data are presented and discussed.

Boix, E.--Semana Vitivinicola 18, (862) 452-3, 455, 457; (863) 524-526, 529; (864) 596-597, 599; (865) 688-670, 673. "Paper chromatography and its application to wines" C.A. 64(3), 10364 E (1966).

(A review of the application of paper chromatography to the analysis of wines and possible detection of contaminants and adulterants)

Cappelleri, G.--Riv. Viticolt. Enol. 16, 43-48. "New methods for detecting hybrid products in wine" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 13(5), 277 (1963); Bull. O.I.V. 36, 524 (1963).

A malvin-rich extract was obtained by adsorption of the wine pigment on charcoal followed by elution with methanol. The characteristic flurescent band was obtained by descending paper chromatography using the Britton-Robinson buffer.

Deibner, L. and Bourzeix, M.--Ann. Technol. Agr. 12(4), 287-312. "On the extraction of colored polyphenolic components from red wines using lead acetate" C.A. 61(4), 15310 A (1964).

Pigments were extracted from red wines by use of neutral and basic lead acetate at various pH levels. Completeness of precipitation and destruction of individual pigment components were studied.

Diemair, W., Postel, W., and Sengewald, H. --Z. Lebensm. -Untersuch. -Forsch. 120, 173-189. "Contribution to the analysis of red pigments in hybrid wines. Communication I of (Investigations of anthocyanins, especially of Malvin)" C.A. 59(2), 6952 E (1963).

Chemistry and occurrence of anthocyans and the theory of color formation in plants are discussed. Analysis of pigments of red wines by paper and column chromatography is treated in detail. Fractional precipitation of the pigments by lead acetate at various pH levels is described in detail. The German method for detection of malvin is included in its entirety.

Drawert, F.--Vitis 4, 42-48. "Application of thin-layer and column chromatography to the separation of anthocyans. Communication III of (Components of musts and wines)" C.A. 60(4), 16465 E (1964).

Fractionation of wine pigmentation by precipitation at various pH levels is described in detail. Studies were made of thin-layer circular chromatography and of column preparative chromatography. The pH 8.2 lead acetate precipitate was used for hybrid detection; techniques are described in detail.

Durmishidze, S.V. and Sopromadze, A.N.--Soobshch. Akad. Nauk Gruz. SSR 30(2), 163-170. "On the possibility of the presence of diglucosides in fruit of V. vinifera" C.A. 59(2), 5498 D (1963); Vitis 4, 83-84 (1964).

(Two-dimensional chromatography of anthocyanins obtained from V. vinifera and V. labrusca fruit revealed the presence of 10 and 18 compounds respectively. Mono- and di- glucosides of known and unknown anthocyanidins were found in extracts of both species. Anthocyanin content in V. vinifera varied depending on the year and the conditions of cultivation.)

Enachescu, G. and Alexiu, A.--Gradina, Via Livada 12(7), 69-77. "Current status of investigations of the color of grapes and red wines" Vitis 4, 198 (1964); B.A. 28(1), 34247 (1964).

Foulonneau, Ch.--Vignes Vins 117, 11-21; 118, 9-18; 119, 7-9. "Some technical aspects of the chromatographic methods employed in enology."

A detailed technical presentation of paper chromatographic techniques and analysis methods for use in enology laboratories.

Gombkoto, G.--Kertesz. Szolesz. Foiskola Evkonye 27, Tom. 11, Fasc. 1, 173-187. "Study of the color of red wine producing grape varieties; pigments of 'Kekfrankos' variety. Communication I of (The anthocyanin pigments of grapes." Hungarian with summary in German. C.A. 61(2), 7658 G (1964).

(The colored components of the hybrid red wine "Kekfrankos"(Linburger) were extracted by 0.1% HCL in MeOH and investigated by paper chromatography. The 3-glycosides of delphinidin, petunidin, malvidin and peonidin and a compound being probably an acylated derivative of 3-malvidin glycoside were identified.)

Hajos, Gy, Bartfai, Z., Kosinszkyne, V., and Paphazy, G.--Elelmiszervizsgalati

Kozlemen. 7, 258-262. "Newest methods of wine research (Detection of hybrid wine by a paper chromatographic method)" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 14, 154-155 (1964).

(For the detection of the presence of hybrid wines investigations were carried out using 6 foreign and simplified Hungarian methods. For this work ascending chromatography (development time = 1 hour) with Schleicher-Schull 2043/b paper and a phosphate buffer (pH 1.81) was shown to be the best method.)

Herrmann, K.--Weinberg Keller 10(4), 154-164; 10(5), 208-220. "Phenolic substances of grapes and wines (flavonoids, aromatic carboxylic acids, pigments and tannins" C.A. 59(2), 6952 E (1963) (Part I); C.A. 59(3), 10737 A (1963) (Part II); Bull. O.I.V. 36, 751 (1963).

(The chemistry and occurrence of the title substances are comprehensively reviewed).

Ille, C. and Stanculescu, C.--Lucrarile Inst. Cercetari Aliment. 6, 193-214.. "Paper chromatography of the anthocyanin pigment of red grapes and wine obtained from certain Vitis vinifera varieties and from certain hybrids" C.A. 61(2), 6346 B (1964).

(The anthocyanin pigments of red grape pulp and peels and of various wines were investigated by circular, mono- and bidimensional paper chromatography. The di- and monoglucoside ratio increased in hybrid wines, and the oenin content increased in noble wines during the vinification.)

Ingalsbe, D.W., Neubert, A.M., and Carter, G.H.--J. Agr. Food Chem. 11(3), 263-268. "Concord grape pigments" C.A. 58(4), 14629 G (1963).

Skin pigments of Concord grapes were extracted and resolved into components by 2-D paper chromatography. Identifications were made by comparison with the Ribereau-Gayon grid and by laboratory tests on some of the pigments. The tartrate sludge from grape juice was fractionated by column chromatographic technique and the fractions were analyzed by paper chromatography.

Kosinszky, V.--Orszagos borm. Intezet Evkonyve (Budapest) Page. 148. "Quantitative determination of the direct-bearing red pigment in wine by means of paper chromatography techniques" Weinbibliographie 7030.

Maeda, Yasuhiko--Bull. Coll. Agr., Utsunomiya Univ. 5(2), 53-57. "A new spectrophotometric method for evaluating the color of grape juice" (Japanese with English Summary) C.A. 59(3), 9245 F (1963).

The color of fresh, stored, and artificially-colored Concord grape juice was evaluated by measurement of the absorbance at 515 millimicrons wavelength at pH levels of 2.0 and 3.4.

Maeda, Yasuhiko--Bull. Coll. Agr., Utsunomiya Univ. 5(2), 59-61. "Observation of the decoloration of canned grape juice during storage" (Japanese with English Summary).

Author determined the O.D. changes of canned grape juice with and without added vitamin C by the Sondheimer method at various times during storage. Data indicated that color of juice without added vitamin C was more stable and had more visual appeal after storage.

Maiorov, V.S., Shashilova, V.P., and Matasova, N.N.--Tr., Tsentr. Nauchn. -Issled. Inst. Pivovarennoi, Bezalkogol'noi i Vinnoi Prom. 1963(11) 61-66. "Application of natural food pigment from grape residues in the production of fruit and berry wines" C.A. 60(2), 6179 E (1964).

Coloring of wine by the addition of the Rudnev-Leonov grape pigment extract was investigated. Time of addition and methods of addition were found to be important and are discussed along with quantities used and results obtained.

Mareca, I. and Diez de Bethencourt, C.--Semana Vitivinicola No. 874. "On the coloring matter and acids of wine" Bull. O.I.V. 36, 751 (1963).

Evolution of the acids and the coloring matter of wine is discussed. Analyses of acids and coloring matter were made using optical density measurements and chromatography. Comments are made on the re-

sults obtained.

Martins, G. Pires--Vinea Vino Port. Doc., Ser II (Enol.) 1(4), 1-30. "The color of wine; its evaluation by a new spectrophotometric process" Bull. O.I.V. 37, 845, No. 0296 (1964).

Author describes a method for the exact evaluation of wine color. 30 transmittance values over the entire range of the visual spectrum were obtained using untreated, undiluted wine in 1-cm. or 0.5-cm. cells depending on the depth of color. Details of the method are given and its application to the study of color changes during wine aging is discussed.

Negrul, A.M. and Liu, Yu-Yan--Tr. Vses. Nauchn, Issled. Inst. Vinodeliya i Vinogradarstva, "Magarach" Vol. XII, 36-74. "Variability and heredity in the coloring of grapes" C.A. 61(2), 8630 B (1964); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 14, 153 (1964).

About 1000 grape varieties and numerous F_1 and F_2 hybrids from experimental vineyards in the Crimea were studied to determine variability in color within a variety (or in hybrids) and the inheritance of color within varieties (or within hybrids). The effect of growing districts on the resulting pigmentation was also studied.

Pataky, B.--Kiserl. Kozlemen. C. Kertesz. 56(3), 105-112. "Some new results of the visual phychophysics employed in the field of measuring the color of red wines" (Hungarian with English Summary) B.A. 43437 (1965).

Ribereau-Gayon, P.--Symp. Intern. d'Oenol., Bordeaux, June 1963. Ann. Technol. Agr. 12, No. hors serie I, 264-265. "Development of anthocyanins in the course of red wine aging" B.A. 74643 (1964).

Different chemical transformations of wine pigment during aging are briefly discussed. These include glucoside hydrolysis, condensation and precipitation, and also demethoxylation.

Ribereau-Gayon, P.--Ind. Aliment. Agr. (Paris) 80(11), 1079-1084. "Differentiation of wines by chromatographic analysis of their coloring matter" C.A. 61 (3), 11291 E (1964).

Author discusses at length the problem of hybrid detection. Reports supporting his results obtained in studies of V. vinifera and hybrid pigmentation are listed; others are subjected to detailed analysis and criticism.

Ribereau-Gayon, P.--Mises Point Chim. Anal. Org.-Pharm. Bromatol. 11, 189-220. "The anthocyanins of fruits; methods of identification and their applications" C.A. 60(1), 2257 G (1963).

This review is essentially a restatement of those portions of his thesis, written in 1959, which apply to the anthocyanins of fruits. Types of anthocyanins present in various fruits are listed in tabular form. Some references are made to publications in 1960 by various authors.

Somaatmadja, D. and Powers, J.J.--J. Food Sci. 28(6), 617-622. "Anthocyanin pigments of Cabernet Sauvignon grapes. Comm. IV of (Anthocyanins)" C.A. 61(1), 3414 A (1964).

Skin pigments of Cabernet Sauvignon grapes were extracted, separated into components by paper chromatography and were identified by laboratory methods. Band intensities were measured with a photodensitometer.

Sudario, E. and Barbero, L.--Ital. Vinicola Agrar. 1963(11), 391. "Study of malvin as an indicator of wine made from direct-producers" Bull. O.I.V. 37, 183, No. 0061 (1964).

Studies were made on the detection of hybrid pigments in vinifera wines, hybrid wines, and blends of the two. Three methods of hybrid detection (Rentschler-Tanner-Brunner, Harvalia and Sudario-Barbero) were investigated and compared.

Sudario, E. and Barbero, L.--Riv. Viticolt. Enol. 16, 336-340. "Chromatographic determination of hybrid wine in Vitis vinifera wine" C.A. 60(1), 2297 A (1964); Bull. O.I.V. 36, 1358 (1963); Weinberg Keller 11, 530 (1964); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15, 97 (1965).

Hybrid pigments in wine blends were detected by ascending paper chromatography using 40% Formalin:Acetone:0.5N HCL (80:15:5) as a solvent and by subsequent observation of chromatograms under UV

light.

Tanner, H.--Schweiz. Z. Obst-. Weinbau 72(25), 607-612. "Phenolic substances in fruits and grapes" Vitis 4, 286 (1964).

Author presents a brief review of the chemistry, biological activity, and occurrence of various phenolic compounds in fruits and grapes as well as beverages made from them.

Tanner, H., Rentschler, H., and Senn, H.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 13, 156-161. "On the characterization of anthocyanin pigments by means of thin-layer chromatography" C.A. 59(4), 13093 H (1963).

Preparation of thin-layer plates and thin-layer chromatography of anthocyanin pigments are described. Fractionation of the pigmentation by precipitation with lead acetate at various pH levels is described.

Tirdea, C. and Tirdea, A.--Lucr. Stiint. Inst. Agron., Iasi 201-207. "Study of the anthocyanins of the chief red native strains by chromatography" B.A. 28(2), 75219 (1964).

Webb, A.D.--Report of Wine Institute Advisory Committee Meeting, Dec. 13, 1963. "Structures of acylated anthocyans of grape skins."

A condensed report on material contained in the Ph.D. Dissertation of R.F. Albach (1964).

Weger, B.--Riv. Viticolt. Enol. 16, 383-385. "Malvin co-ordinated zones in the chromatographic investigation of pigment of hybrid direct bearers" Vitis 4, 329 (1964); Bull. O.I.V. 36, 1471 (1963); Weinberg Keller 11, 529 (1964).

Studies showed the Diemair-Sengewald-Bieber method to be superior to the Harvalia and Jaulmes-Ney methods for the detection of hybrid pigments. Haut-Adige wine samples were found to be free of hybrid pigment using this method.

Zakow, D.--Nauchni Tr., Nauchnoizsled. Inst: Vinarska Pivovarna Prom., Sofia 6, 5-30. "The tannic and colored substances of varieties Gumza and Zarchin" C.A. 61(1), 4701 H (1964).

Author discusses tannins and changes in tannin content in grape leaves and grapes during the ripening period. He found that pigment extraction from skins during fermentation varied with different varieties, the highest percentage being from lightly-colored varieties.

1964

Albach, R.F.--Ph.D. Thesis (University of California, Davis) "Complex anthocyans of Vitis vinifera grapes."

Acylated skin pigments of Durif, Saint Macaire and Tinta Pinheira grapes were extracted and subjected to paper chromatography for the separation and purification of the pigment. Chemical and instrumental methods were used to ascertain the structure of these acylated components.

Anonymous--Bol. Inst. Nac. Invest. Agron. 24, 217-218. "Contribution to direct-bearing hybrid research. Chromatographic analysis of the pigment" Vitis 5(4), 337 (1966).

Antonelli, F.--Riv. Viticolt. Enol. 17, 375-379. "Chromatographic detection of wine made from direct-producing hybrid varieties" C.A. 62(1), 3372 E (1965); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(1), 74-75 (1966).

Wine was chromatographed by application to paper and development in 0.1 N NaOH. Emerald green fluorescent spots distinguished malvin of hybrids from blue fluorescent spots of viniferas.

Armandola, P.--Ind. Alimentari 1964(12), 63. "Investigation of red hybrid wines by paper chromatographic analysis of the pigments" Weinbibliographie 6275.

Bolcato, V., Losito, F., Campanella, V., and Pallavicini, C.--Riv. Viticolt. Enol. 17(1), 24-34. "Changes in the coloring substances of wines following oxidase-induced cleavage on flavoids, anthocyanins and tannins were studied in wines obtained from Bombino nero, Malvasis bianca, Baresana rossa and Italia bianca grapes. Data, including chromatograms, are presented and discussed.

Cappelleri, G.--Riv. Viticolt. Enol. 17, 165-170. "Simplification and increase in the sensitivity of the chromatographic procedure for hybrid wine studies" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15(2), 101-102 (1965); Bull. O.I.V. 37, 845, No. 0294 (1964).

Wine pigments were adsorbed on charcoal, methanol-eluted, concentrated, acidified, and paper chromatographed using Britton-Robinson buffer. Hybrid pigment fluoresced brick red under UV light.

Cappelleri, G., Calo, A., and Liuni, C.S.--Riv. Viticolt. Enol. 17(7), 284-302. "The inheritance of malvidin diglucoside in the pigments of the berry of the Genus *Vitis L.*" Am. J. Enol. Viticult. 16(2), 111-112 (1965).

Authors investigated the malvin content of 35 rootstocks and 62 direct producers (French hybrids). Inheritance of color is discussed. Authors hypothesize that three independent pairs of genes are involved.

Deibner, L. and Bourzeix, M.--Ann. Technol. Agr. 13(3), 263-282. "Research on the detection of anthocyan diglucosides in wines and grape juice by paper chromatography and fluoroscopy of the obtained spots" C.A. 62(2), 7070 G (1965).

Paper chromatographic techniques and fluorescence evaluation in the study of hybrid pigmentation detection are described in detail. Basic lead acetate precipitation of pigment is described and is recommended.

Deibner, L., Bourzeix, M., and Cabibel-Hughes, Mir.--Ann. Technol. Agr. 13(4), 359-375. "The separation of anthocyanic diglucosides by thin-layer chromatography and their spectrophotometric quantitation" C.A. 63(1), 2356 A (1965).

Report describes the preparation of cellulose-coated thin-layer plates, thin-layer chromatography of pigments, elution of pigments from the plates and the spectrophotometric evaluation of the eluted pigments.

Eisenbrand, J. and Hett, O.--Z. Lebensm. -Untersuch. -Forsch. 125, 385-390. "On the stimulation of the fluorescence of malvin on filter paper" C.A. 62(1), 3373 B (1965); Weinberg Keller 12(1), 34 (1965); Vitis 5(4), 338 (1966).

Authors found that the fluorescence of malvin on chromatography paper was most stimulated by green light at 544 millimicrons wavelength using either high pressure or low pressure mercury lamps. Red fluorescence could then be either viewed or photographed by the use of an appropriate filter.

Gombkoto, G.--Dissertation (Budapest, Hungary) (Hungarian) "Investigation of the pigments of our red wines" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(5) Documentation Section (1966).

Gombkoto, G.--Kertesz. Szolesz. Foiskola Kozlemen. Tom. 1, Fasc. 3, Vol. 28, 289-307. "The color substances of red wine type grapes. Communication II of (The anthocyanin pigments of grapes)" (Hungarian with summary in English) B.A. 065685 (1966); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(4) Documentation Section (1966).

Skin pigmentation of Medoc Noir, Oporto, Kadarka, Kekfrankos, Cabernet Sauvignon. Cabernet Franc, Alicante Bouschet and Othello grapes was extracted and subjected to paper chromatographic examination. Othello was found to contain diglucosides. Band chromatograms were subjected to instrumental evaluation to determine the relative concentrations of the pigments.

Lipis, B.V., Lyalikova, R. Yu, and Chernichuk, L.L.--Tr. Moldavsk. Nauchn. -Issled. Inst. Pishchevoi Prom. 4, 109-114. "Spectrophotometric determination of tannins and coloring matter in grape juice and wine" (Russian) C.A. 63(2), 7622 F (1965).

(A method requiring about 5 minutes for the determination of combined tannins and coloring matter in grape juice and wine is described. Since maximum absorbances of both combined tannins and coloring matter occur at 280 millimicrons wavelength, the diluted samples were read at this wavelength and the total concentration was calculated in terms of tannic acid (g/L) from a predetermined calibration curve. Accuracy of the method is in the 0.005-0.010 g/L range.)

Maglitto, C., Gianotti, L., and Mattarei, C.--Boll. Lab. Chim. Provinciali (Bologna) 15(4), 354-359 "Rapid extraction of pigments and their detection by thin-layer chromatography. I. Research of cuprous chlorophyllins in preserves, of malvin from hybrid wines, and of vegetable extracts added to brandies" C.A. 62(3), 9697 D (1965).

A method for the rapid extraction of pigmentation from foods and its characterization by thin-layer chromatography on silica gel is described in detail. The method was used for detecting hybrid producer wine added to grape brandy.

Mamakova, Z.A.--Sadovodstvo Vinogradarstvo i Vinodelie Moldavii 1964(8), 32-34 (Russian) "Chromatographic detection of hybrid-direct producer impurities in products of grape processing" C.A. 63(3), 14008 D (1965).

(Unidimensional chromatography in a buffer solution of Phosphoric Acid:Acetic Acid:Boric Acid (3.92:2.4:2.48) grams respectively per liter of water with pH 1.81 was used to detect hybrid-direct producer impurities in wines. The chromatograms were examined under UV light. Brick-red fluorescence indicated an impurity of a hybrid-direct producer. The fluorescence intensity was compared with an alcoholic solution of pinacyanol. The method can detect 1% impurity.)

Mareca, I.--Atti Accad. Ital. Vite Vino 16, 95-99. "Laboratory techniques for the study of the coloring matter of wine" Bull. O.I.V. 39, 768, No. 1192 (1966).

A detailed description of the concentration and chromatography of wine samples and other laboratory techniques used by the author.

Mareca, I.--Semana Vitivinicola 19, 604-607. "What we know and do not know about the pigment of wine" Vitis 4, 326 (1964).

Mareca, I.--Semana Vitivinicola 933, 2191-2197. "On the measurement of wine color" Bull. O.I.V. 37, 979, No. 0355 (1964).

Report contains spectrophotometric curves made from wine samples and a description of techniques employed. Problems experienced in measurement of wine color are discussed.

Mareca, I. and Artacho, E.--Atti Accad. Ital. Vite Vino 16, 101-109. "On the color of wines" Bull. O.I.V. 39, 768, No. 1191 (1966).

Study deals with the color of wines and the chemical nature, structure, and properties of the components which are responsible for the color. Changes during the aging are studied by running optical density curves at various wavelengths.

Mareca, I. and Gonzalez, A.--Ind. Aliment. Agr. (Paris) 81, 391-397. "On the composition of the coloring matter of red wines" C.A. 65(5), 20796 A (1966); Bull. O.I.V. 37, 982, No. 0362 (1964); Vitis 5(6), 516 (1966).

(In this report the authors describe their experimental work performed using the coloring matter of red wines of different origin and different years of storage and also with an extract of grape skins, a pure compound (Malvin Chloride) and a commercial natural concentrate.)

Pifferi, P.G. and Zamorani, A.--Riv. Viticolt. Enol. 17(3), 115-121. "Contribution to the knowledge of the coloring material of wines. II. Influence of sulfur dioxide and refermentation on the anthocyanins of wine" C.A. 61(2), 7659 F (1964); Vitis 4, 430 (1964); Am. J. Enol. Viticult. 15(4), 223 (1964); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15(2), 100-101 (1965).

(Using 2-D paper chromatography the effects of high levels of sulfur dioxide on anthocyanin composition and the effects of refermenting a wine with the press-cake or pomace from a wine of the succeeding year are investigated. Controls are vinified normally in each case.)

Pintar, J.--Agron. Glasnik 14(6), 401-411. "Paper chromatographic investigation of anthocyans in red Vitis vinifera wines and hybrids of the wine growing region Svetozarevo-Krusevac-Aleksandrovac, Yugoslavia" (Croatian) C.A. 62(3), 9738 D (1965); B.A. 102415 (1965); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15(4), 207 (1965).

Authors investigated 29 samples of red wines paper chromatographically for the detection of hybrid pigment. The Jaulmes-Ney, Diemair-Sengewald-Bieber,

Diemair-Postel-Sengewald, and Harvalia methods were tested and sensitivities were evaluated.

Rankine, B.C.--Aust. Wine Brew. Spirit Rev. 82(6), 40-42. "Heat extraction of color from red grapes for wine making" Vitis 4, 431 (1964).

Ribereau-Gayon, P.--Ann. Physiol. Vegetale 6(2), 119-147; 6(3), 211-242; 6(4), 259-282. "The phenolic compounds of grapes and wines" C.A. 62(2), 7069 F (Part I: Phenolic Acids); C.A. 63(1), 2355 G (Part II:Flavonol glycosides and anthocyanins); C.A. 63(3), 14005 H (Tannins) (1965).

Appears in summary form in: Wines Vines 46(5), 26-27 (1965); Weinberg Keller 12(6), 277-281 (1965); Riv. Viticolt. Enol. 18, 503-508 (1965); Semana Vitivinicola 20, 1705-1707(1965); Lozarstvo Vinarstvo (Sofia) 15(3), 42-45 (1966); Vinea Vino Port. Doc., Ser. II (Enol) 2(4), 1-5 (1965).

Part II (Flavonol glycosides and anthocyanins) deals with the chemistry, separation-identification techniques, and practical applications of studies of anthocyanins. Coloring matter of red wine, quantitation of anthocyanins and the change of wine color during aging are also discussed at length.

Ribereau-Gayon, P. and Haimovici, F.--Volume de Conferences et Communications du 4th Congres de l'Association Internationale d'Expertise chimique, Athens, Greece 361-365. "Use of thin-layer chromatography for the differentiation of wines" Bull. O.I.V. 39, 1261, No. 1352 (1966).

Author describes the advantages and disadvantages of using thin-layer chromatography for the detection of hybrid pigment in wines; conclusion is that paper chromatography, detecting 2% hybrid pigment, is more practical for routine use.

Rice, A.C.--J. Assoc. Offic. Agr. Chemists 47(4), 671-676. "Identification of grape varieties" C.A. 61(3), 11008 B (1964).

California and Concord juice samples from different geographical areas and Concord anthocyanins were analyzed spectrophotometrically at pH levels of 2-8 in a study of the unique response of Concord juice at pH 7.

Samoradova-Bianki, G.V.--Fiziol. Rast. 11(3), 544-548; Soviet Plant Physiology 11(3), 462-466. "Paper chromatography of anthocyans and flavonoids" C.A. 61(2), 7359 B (1964).

Report contains procedures for the extraction, separation, and identification of anthocyanins of fruits and flowers. Results of identifications by paper chromatography and other laboratory techniques are included.

Singleton, V.L., Berg, H.W., and Guymoni, J.F.--Am. J. Enol. Viticult. 15(2), 75-81. "Anthocyanin color level in port-type wines as affected by the use of wine spirits containing aldehydes" C.A. 61 (4), 15309 D (1964).

Optical densities were measured at 520 millimicrons wavelength on samples of wine prepared with and without addition of aldehydes (still "heads") along with EtOH to partly fermented red juice from five varieties of V. vinifera grapes. Data are presented in tabular form and are discussed and interpreted.

Tercelj, D. and Pintar, J.--Arhiv Poljoprivredne Nauke 17(57), 142-157. "The differentiation of V. vinifera varieties and red hybrids cultivated in Yugoslavia by paper chromatography" (Serbain with summary in French) Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15(4), 205-206 (1965); B.A. 65134 (1965).

Various paper chromatographic methods for hybrid detection in noble and hybrid wines of Slovenia were investigated and results of studies are included. The precise German Official Method was recommended for wines to be exported.

Van Wyk, C.J. and Ventner, P.J.--So. African J. Agri. Sci. 7, 731-738. "An investigation into the occurrence of malvin in South African dry red wines" C.A. 63(4), 17088 C (1965).

Methods for the extraction and concentration of pigment and for the paper chromatographic detection of hybrid pigment according to Ribereau-Gayon, Marichal, Drawert, Reuther, and Diemair-Bieber were

tested; the Diemair-Bieber method, with modifications for better reproducibility, was found to be best. Malvin in low concentration was found in certain V. vinifera samples tested.

Vielsacker, J. and Wagner, F.--Mitt.-bl. GDch-Fachgr. Lebensmittelchemie gerichtl. Chemie 18, 62-63. "On the detection of hybrid pigment in red wines" Weinberg Keller 11, 392 (1964); Vitis 4, 329 (1964).

Authors found the solvent, 5% tartaric acid:EtOH (9:1), to be far superior to the acetic acid solvent of the Official German Method for hybrid detection. 5% aqueous tartaric acid is proposed as a solvent for the ascending, unidimensional paper chromatographic screening of suspected wines prior to more precise determinations.

Webb, A.D.--Proc. Plant Phenolics Group Symp. No. 4, July 23-24, Chapter 4, 21-37. "Anthocyanins of grapes."

Review of investigations of grape and wine pigmentation by classical and more recently developed laboratory techniques. Results of varietal studies and studies of acylated pigments and reversible decolorization of anthocyanins.

Zamorani, A. and Pifferi, P.G.--Riv. Viticolt. Enol. 17(2), 85-93. "Contribution to the knowledge of the coloring materials of wines. Part I. Identification and quantitative valuation of the anthocyans of V. vinifera wine (Merlot) and hybrid wine (Clinton and Baco)." C.A. 61(2), 7659 D (1964); Am. J. Enol. Viticult. 15(4), 221 (1964); Proc. Plant Phenolics Group Symp. No. 4, July 23-24, Chapter 4, 32 (1964); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15, 100 (1965).

Wine anthocyanic pigments were concentrated and purified by precipitation with basic lead acetate at a pH level of 8.5-9.0, liberation with 2% methanolic HCl and further concentration and purification using ether and ethyl acetate. Extract was subjected to 2-D chromatography and pigment eluted from formed spots was identified by laboratory techniques and was quantitated by taking optical density readings.

1965

Albach, R.F., Kepner, R.E., and Webb, A.D. --J. Food Sci. 30(1), 69-76. "Structures of acylated anthocyan pigments in V. vinifera variety Tinta Pinheira. I. Identification of anthocyanidin, sugar and acid moieties" C.A. 62(3), 9459 F (1965).

Skin pigments of Tinta Pinheira grapes were extracted, separated into components by paper chromatography and identifications were made by paper chromatographic and other laboratory techniques. Monoglucosides acylated with p-coumaruc acid and caffeic acid were identified.

Albach, R.F., Webb, A.D., and Kepner, R.E.--J. Food Sci. 30(4), 620-626. "Structures of acylated anthocyan pigments in V. vinifera variety Tinta Pinheira. II. Position of acylation" C.A. 63(3), 11917 A (1965).

Investigation of the position of attachment of the p-coumaric acid in the acylated pigments isolated in Part I from Tinta Pinheira grapes showed it to be position four on the glucose of the monoglucosides.

Andreev, V.V.--Vinodelie i Vinogradarstvo SSSR 25(3), 13-17. "Possibilities for the extraction of coloring substances from wine grapes" C.A. 63(3), 10632 C (1965); Bull. O.I.V. 38, 840, No. 0737 (1965).

Author describes studies of anthocyan extraction from grape marc using 0.5% HCl, 0.2% Sulfurous Acid and 0.6% Sulfurous Acid. The latter solvent was best, six 4-hour extractions removing practically all of the color.

Anonymous--Compte-rendu de la 7th reunion de la Sous-Commission des methodes d'analyes et elements constitutifs des vins. (Paris: May 4-5, 1965). Bull. O.I.V. 38, 795. "Research on anthocyans: Malvidin Diglucoside."

Recent methods of malvin detection of Eisenbrand, Dorier, and Ribereau-Gayon are mentioned and the importance of sensitivity of the methods is discussed.

Burkhardt, R.--Mitt.-bl. GDch-Fachgr. Lebensmittelchemie gerichtl. Chemie 19,

87-88. "On the detection of hybrids" Weinberg Keller 12(6), 289 (1965).

Author recommends Ribereau-Gayon two-dimensional paper chromatographic method for the detection of hybrids. Malvin was applied as a reference spot prior to chromatography in each direction.

Cano Marotta, C., Grois, G., and Ares Pons, J.--Kem. Intern. 1(1), 21-26. "Coloring material of grapes and tinted wines from Uruguay" (Esperanto) C.A. 64(1). 4224 D (1966).

(Two-dimensional paper chromatography using first water and then butanol:acetic acid:water (4:1:5) of extracts from wines and from grapes from which wines were prepared led to the identification of the 3,5-diglucoside of phenidol as one constituent.)

Cappelleri, G.--Riv. Viticolt. Enol. 18, 350-356. "Investigation of malvin in V. vinifera wines" Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(3), 253 (1966); Bull. O.I.V. 38, 1129, No. 0843 (1965).

109 samples of wines made from European grape varieties were analyzed by paper chromatography for the presence of malvin. Negrara veronese and Negrouza indicated malvin; its presence was confirmed by two-dimensional paper chromatography.

Coffelt, R.J. and Berg, H.W.--Wines Vines 46(7) 23. "Color extraction by heating whole grapes" B.A. 13870 (1966).

A brief report on the results of three years of work on color extraction by treatment of whole grapes with steam under pressure.

Deibner, L. and Bourzeix, M.--Ann. Fals. Expert. Chim. 58(665), 107-109. "Detection of anthocyanic diglucosides in red wines by the use of oenocapillarography" C.A. 63(1), 4908 D (1965); B.A. 75418 (1965); Bull. O.I.V. 38, 543, No. 0694 (1965).

Authors point out the advantages of using oenocapillarography for the detection of malvin in hybrid wines and wine blends. Method can detect 0.5-1.0% of hybrid wine in a blend. Description of the method is given.

Deibner, L. and Bourzeix, M.--Ann. Fals. Expert. Chim. 58(666), 149-159. "The current status of the detection of anthocyanic diglucosides in wines and grape juice" C.A. 63(3), 14005 G (1965); B.A. 102398 (1965); Bull. O.I.V. 38, 1131, No. 0850 (1965).

Authors review paper chromatographic methods of hybrid detection in wine blends.

Deibner, L. and Bourzeix, M.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15(4), 165-177. "On the extraction of anthocyans from grapes" C.A. 63(4), 18540 B (1965); B.A. 061222 (1966).

Literature on anthocyanin extraction is reviewed; studies are described and discussed. 0.1 N methanolic HCl was found to be best for anthocyanin extraction from fresh and dried grape skins; for malvin detection, 0.001 N aqueous HCl was found to be the best solvent.

Eisenbrand, J., Hett, O., and Becker, G.--Deut. Lebens.-Rundschau 61(1), 8-11. "On the direct detection of malvin in solutions by its fluorescence and the use of red wine dilutions" C.A. 63(1), 1194 A (1965); Weinberg Keller 12(6), 290 (1965); Vitis 5(3), 245 (1965); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(4), 335 (1966).

A method for the preliminary screening of suspected hybrid wines by measurement of the fluorescence intensity at 580 millimicrons wavelength in acetic acid solution is described. Confirmation was then made by circular paper chromatography.

Eisenbrand, J., Hett, O., and Becker, G.--Deut. Lebens. -Rundschau. 61(6), 177-181. "On the fluorescence of red wine dilutions" J. Sci. Food Agr. 17(1), 132 (1965); Weinberg Keller 12(9), 437-438 (1965); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(4), 331 (1966).

Report contains results of analyses of 121 commercial red and rose' wines using their method and by circular paper chromatography.

Getow, G. and Petkow, P.--Lozarstvo Vinarstvo (Sofia) 14(3), 24-30. "Studies on the presence of malvin in some newly introduced European red varieties and hy-

brid types of grapes" Bull. O.I.V. 38, 846, No. 0753 (1965).

Skin extracts from recently-introduced Bulgarian hybrid grapes were subjected to ascending and circular paper chromatography for the detection of diglucoside pigment (malvin). Details of the procedure and results of the analyses are given.

Gombkoto, G.--Kertesz. Szolesz. Foiskola Kozlemen. Tom. 2, Fasc. 1, Vol. 29, 171-182. "Some methods for the chromatographic separation of anthocyanins. Communication III of (Anthocyan pigments of grapes)" C.A. 64(5), 20167 C (1966); B.A. 065684 (1966); Hung. Agric. Rev. 15(3), 20 (1966).

Report contains a description of paper chromatographic techniques used for the analysis of the color of grapes used for the production of red wines.

Harvalia, A.--Chim. Chronika (Athens) 30(9), 155-159. "Color of red wines" C.A. 64(1), 2715 H (1966).

Studies were made on the effect of the sulfur dioxide level on the formation of color during fermentation with and without skins. Studies of color changes during the aging were also made.

Kain, W. and Arndorfer, H.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 15(3), 123-127. "Contribution to the detection of red direct-bearing wines" C.A. 63(2), 7621 F (1965).

One- and two-dimensional paper chromatographic studies showed that one-dimensional chromatography using 0.01 N HCl could indicate only monoglucosides when fluorescent acylated diglucosides were present in wines.

Mar Monux, D.--Semana Vitivinicola 20, 1545-1549. "Chromatographic analysis of hybrid wines" C.A. 64(3), 11821G (1966); Vitis 5(6), 516 (1966).

(Wines produced from hybrid grapes were analyzed by paper chromatography to determine the nature of the anthocyanin pigments and sugars. Wines derived from hybrid grapes contained monosaccharides and disaccharides; wines from non-hybrid grapes had one or the other. Wines from different regions of Spain were chromatographed and the color of the fluorescence was recorded.)

Mareca, I. and Artacho, E.--Semana Vitivinicola 20, 149-154. "Spectrophotometric measurement of color differentiates the wines" Bull. O.I.V. 38, 318, No. 0610 (1965); Vitis 5(3), 247 (1965).

Study of the color transformations in red and white wines during the aging process. Pure malvin solutions were also used in this study. Data are presented graphically and are discussed.

Mareca, I. and Diez de Bethencourt, C.--Publ. Inst. Quim. "Alonso Barba" (Madrid) 22, 5-11. "On the coloring matter and the acids of wine" Bull. O.I.V. 39, 367, No. 1060 (1966).

Study of the colorant substances of wine. Discussion of the results of chromatography, colorant analyses and optical density curves of samples taken during the aging process.

Mareca, I. and Gonzalez, A.--Compt. Rend. Acad. Agric. France 51(9), 636-643. "Contribution to the study of the evolution of the coloring matter of wines" B.A. 006111 (1966); Vitis 5(4), 315 (1966); Bull. O.I.V. 38, 1295, No. 0888 (1965).

Study of changes in color content during the ripening of grapes and during the fermentation of musts and during the aging of wines.

Mareca, I. and Gonzalez, A.--Semana Vitivinicola 20, (1964), 315-320. "Composition of the pigment in red wines" Bull. O.I.V. 38, 321, No. 0619 (1965); Vitis 5(3), 247 (1965).

Author presents laboratory techniques for the study of the colorant material in wines. Report contains photographs of chromatograms, electrophoretograms, optical density curves and author's interpretation of same.

Mareca, I. and Gonzalez, A.--Vitis 5(3), 201-211. "Evolution of coloring matter from the grape to the wine" C.A. 65(1), 4612 E (1966); Bull. O.I.V. 39, 231, No. 1010 (1966).

Study of the changes in the colorant material during the ripening of the

grapes, during the fermentation of the musts, and during the aging of the wine. Chromatograms and spectrophotometric curves are included and are interpreted.

Maruyama, C. and Kushida, T.--Bulk. Res. Inst. Ferment., Yamanashi Univ. 12, 41-46. "Enological studies on the color of red wines. VI. Extraction and utilization of the red color from grape skins" C.A. 65(5), 20796 G (1966); Bull. O.I.V. 39, 1361, No. 1384 (1966).

Study of the extraction of color from Muscat Bailey A grape skins by various concentrations of ethanol. 63% ethanol yielded the best quality extract for use in the coloring of white wines.

Pifferi, P.G. and Zamorani, A.--Ind. Agr. 1965(12), 563-565. "Contribution to the knowledge of the coloring substances of wines" Bull. O.I.V. 39, 231, No. 1009 (1966).

Study of the monoglucoside and diglucoside pigments in Lambrusco, Fogarino, Friulato, and Raboso grapes using techniques described in earlier publications.

Ribereau-Gayon, P.--Bull. Soc. Sci. Hyg. Aliment. 53, (10/12), 232-248. "The color of wines" B.A. 031123 (1966); Bull. O.I.V. 39, 366, No. 1060 (1966).

Author discusses types of phenolic compounds which are responsible for the coloration of wines, the measurement of optical densities and the color changes which occur during the aging of wines.

Ribereau-Gayon, P.--Bull. Tech. Inform. Ing. Serv. Agr. 196, 193-195. "Applications of chromatographic techniques in enology" Bull. O.I.V. 38, 845 No. 0750 (1965); Vitis 6(1), 126 (1967).

Author discusses theoretical knowledge of wine components which has been obtained by application of chromatographic methods and the practical application of these methods in the field of enology.

Ribereau-Gayon, P.--Compt. Rend. Acad. Agric. France 51(3), 135-140. "New observations on the differentiation of wines from V. vinifera and the hybrids" Bull. O.I.V. 38, 660, No. 0737 (1965).

Two new methods for the detection of hybrid pigment in V. vinifera wines are described. The first involves thin-layer silicic acid chromatography and the second is based on changes in the fluorescence at low temperatures.

Ribereau-Gayon, P. and Nedeltchev, N.--Ann. Technol. Agr. 14(4), 321-330. "Discussion and application of some modern methods of quantitation of anthocyanins and tannins in wines" C.A. 64 (5), 20587 G (1966).

Various methods of determining the anthocyanin and tannin content of wine are reviewed. Studies were made on the effect of maceration time and heating during vinification on the wine color.

Ribereau-Gayon, P. and Stonestreet, E.--Bull. Soc. Chim. France 2649-2652. "The quantitation of anthocyanins in red wine" C.A. 64(1), 1316 C (1966).

Two methods of anthocyanin quantitation in red wine are described and discussed. The first is based on absorbance differences at pH 0.6 and 3.5; the second is based on the decolorization of anthocyanins with sodium bisulfite.

Rice, A.C.--J. Assoc. Offic. Agr. Chemists 48(3), 525-530. "Identification of grape varieties" C.A. 63(2), 7577 E (1965).

Further studies indicated that detection of adulteration of Concord juice with V. vinifera juice by spectrophotometric analysis is not feasible. Paper chromatographic studies of Concord pigmentation are described and application to adulterant detection is indicated.

Samvelyan, A.M.--Izv., Sel'skoknoz. Nauki, Min. Sel'sk. Khoz. Arm. SSR 8(7), 55-62. "The coloring matter of grapes and important factors in its production" C.A. 65(2), 7968 D (1966).

Extraction of color from grape skins for industrial use and for coloring wine is described. Color development in the ripening grapes was studied and is discussed.

Smith, R.M. and Luh, B.S.--J. Food Sci. 30, 995-1005. "Anthocyanin pigments in the hybrid grape variety Rubired" C.A. 64(2), 7041 E (1966).

Anthocyanin pigment of Rubired grapes was extracted and purified by use of methanolic HCl and ion exchange resin. Resolution into components was effected by 1-D and 2-D paper chromatography. Pigments were identified by paper chromatographic and other laboratory techniques.

Stonestreet, E.--These doctorat de 3rd cycle (Oenologie), Bordeaux. "Contribution to the study of tannins and of the coloring matter of red wines" Reference in Ribereau-Gayon; Stonestreet (1965).

Valuiko, G.G.--Izv. Vysshikh Uchebn. Zavedenii, Pishchevaya Tekhnol. 1965(2), 83-85. "The influence of some antioxidants on the stability of the anthocyanins during storage of wine" C.A. 63(1), 3581 F (1965).

Studies of antioxidants used in vinification indicated that part of the sulfur dioxide could be replaced with ascorbic acid with no deleterious effect on the resulting wine color.

Valuiko, G.G.--Prikl. Biokhim. Mikrobiol. 1(2), 242-243. "Binding of tanning substances and pigments of wine by aldehydes" C.A. 63(2), 7622 D (1965).

Acetaldehyde and formaldehyde were added in varying amounts to red wine and the effects on tannin precipitation and anthocyanin decolorization were noted. The results of studies are discussed.

Valuiko, G.G.--Vinodelie i Vinogradarstvo SSSR 1965(6), 8-10. "Changes in the content of coloring substances and tannins during the aging of the red table wine" B.A. 30(1), 006135 (1966).

Yankov, A.T. and Balkandzhiev, G.N.--Lozarstvo Vinarstvo (Sofia) 14(7), 42-45. "Enocyanine from Alicante Teras-20 grape skins" C.A. 64(3), 10362 G (1966).

Color was extracted from Alicant Teras-20 grape skins using various solvents (ethanol, 2% sulfuric acid, 2% HCl, 2% Citric Acid) in various combinations and the extract was concentrated for use in coloring wine. Solvents and extraction times are discussed.

1966

Anonymous--Comte-rendu de la 8th reunion de la Sous-Commission des methodes d'analyses et elements constitutifs des vins. (Paris: May 4-5 1965) Bull. O.I.V. 39, 1051-1052. "Oenology. Analysis methods and components of wines."

Methods of hybrid detection as proposed by Ribereau-Gayon and Haimovici, Eisenbrand-Hett-Becker, Dorier-Verelle, and Garoglio-Stella are discussed and criticized.

Armandola, P.--Ind. Agr. 339-341. "On the study of anthocyanic glucosides in wines" Bull. O.I.V. 39, 1502, No. 1438 (1966).

The detection of malvin by examination of fluorescent pigment oxidation products is criticized and compared with official and classical methods.

Deibner, L. and Bourzeix, M.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(3), 200-206. "On the total extraction of the anthocyanins from the skins of red wine grapes."

Studies of the number of extractions with 0.1 N HCl at various temperatures which are necessary for total extraction of pigment from Carignan and Aramon grape skins.

Deibner, L., Bourzeix, M., and Cabibel-Hughes, Mir.--Ann. Fals. Expert. Chim. 59 (669), 39-47. "Analytical value of the separation of wine and grape juice anthocyanins by lead acetate and by ion exchange resins" C.A. 65(3), 9692 E (1966).

Studies of the precipitation of anthocyanins with neutral and basic lead acetate at various pH levels showed that incomplete precipitation and pigment losses occur. Ion exchange resins were found to be equally unsatisfactory for quantitation of anthocyanin components.

Dorier, P. and Verelle, L.P.--Ann. Fals. Expert. Chim. 59 (699), 1-10. "A new method for the study of anthocyanic diglucosides in wines" C.A. 65(3), 9692 D (1966); Bull. O.I.V. 39, 630, No. 1152 (1966); Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(5), 428 (1966).

Authors describe a method of hybrid de-

tection based on the development of green-fluorescing oxidation products when acidified wine is treated with sodium nitrite and then made alkaline with ethanolic ammonia solution. The method is very sensitive and is applicable to lightly-colored wines.

Gavrish, G.A.--Vinodelie i Vinogradarstvo SSSR 26(2), 26-29. "Change in composition of juice in the process of withering of grapes" C.A. 65(1), 2966 D (1966).

Studies were made to determine the effect of the withering of grapes under various conditions prior to fermentation on the color, bouquet, and organoleptic characteristics of wine.

Gentilini, L. and Cappelleri, G.--Riv. Viticolt. Enol. 19(11), 438-453. "Concerning adulteration with hybrid wine" Bull. O.I.V. 40, 90, No. 1473 (1967).

Numerous samples of various products, some containing and some devoid of malvin, were tested by conventional 2-D chromatographic methods and by the more rapid nitrite oxidation method. Inconsistency in the obtained results indicated that the more rapid method should not be used for routine screening analyses pending further improvements in the technique.

Getow, G. and Petkow, G.--Gradinar. Lozar. Nauka (Sofia) 3(2), 263-272. "Analysis of the malvin content of Vitis vinifera varieties" C.A. 65(4), 14094 E (1966); Bull. O.I.V. 39, 1360, No. 1382 (1966).

Studies of the pigmentation of 200 red and black V. vinifera grape samples showed that 13 samples (7%) contained malvin. Authors believe that screening methods based on the paper chromatographic detection of malvin can lead to false conclusions as to the origin and the hybrid adulteration of tested wine samples.

Getow, G. and Petkow, G.--Mitt. (Klosterneuburg) Ser. A, Rebe Wein 16(3), 207-210. "Proof of the presence of malvin in V. vinifera varieties."

Studies are the same as those described in preceding reference. Studies made by European investigators who found malvin in V. vinifera samples are described and are discussed.

Koeppen, B.H. and Basson, D.S.--Phytochemistry 5(1), 183-187. "The anthocyanin pigments of Barlinka grapes: C.A. 64(3), 13090 E (1966).

Pigmentation of Barlinka grape skins was extracted and subjected to purification and separation by paper chromatographic techniques. Anthocyanic components were identified by paper chromatography and laboratory tests as malvidin derivatives (3-glucosides) and traces of delphinidin and petunidin derivatives (3-glucosides).

Lefevre, P.M.--Vinea Vino Port. Doc., Ser. II (Enol) 3(1), 1-35. "Determination of malvidin diglucoside in wines. Comparative study of some methods of paper chromatography" Bull. O.I.V. 39, 947, No. 1242 (1966).

Studies of hybrid detection in V. vinifera wines were made using three methods: the French method of Jaulmes-Ney (1960), the proposed German method (1961) and the Grecian method of Harvalia (1961-1962). Author concludes that they should not be used as rigorous methods indicating hybrid-adulteration.

Mareca, I. and Gonzalez, A.--Semana Vitivinicola 25/26, 1125-1131. "The evolution of the coloring matter in the grape during fermentation and in the wine up to the time of its consumption" Bull. O.I.V. 39, 947 No. 1243 (1966).

(A study of the multiple chemical and biological phenomena which successively are observed in grapes and wine. Experimental techniques used for following the evolution of the color during the ripening and the fermentation. Results are presented as spectrophotometric curves.)

Ribereau-Gayon, J. and Peynaud, E.--"Traite d'Oenologie" (Treatise on Enology") (Paris:Dunod) Volume I (1964); Volume II (1966) C.A. 65(3), 12825 E (1966).

Volume I (Ripening of grapes; Alcoholic fermentation; Wine making (1964). Volume II (Composition, transformations and treatments of wines (1966).

Robinson, W.B., Bertino, J.J., and Whitcombe, J.E.--Am. J. Enol. Viticult. 17(2), 118-125. "Objective measurement and specification of color in red wines" B.A. 080536 (1966).

A study to determine the suitability of the Hunterlab Color and Color Difference Meter for wine color specification and research. The effects of dilution, sulfite treatment and heating were measured; data are presented graphically and are discussed.

Robinson, W.B., Weirs, L.D., Bertino, J.J., and Mattick, L.R.--Am. J. Enol. Viticult. 17(3), 178-184. "The relation of anthocyanin composition to color stability of New York State wines" C.A. 66, 9945 S (1967).

The relative stabilities and color characteristics of isolated anthocyanic pigments in white wine solution were measured instrumentally and results are discussed.

Shewfelt, A.L.--S. Carolina Agr. Exp. Sta., Tech. Bull. No. 1025 (Dec. 1966) "South Carolina Concord Grapes."

Eight Concord juice samples, six from South Carolina and two from Geneva, New York, were subjected to lead acetate precipitation at one low pH level for purification and concentration of pigment. The resulting extracts were separated into components by one- and two-dimensional paper chromatography; bands were characterized and Analytrol traces were made for quantitative estimates.

Somers, T.C.--J. Sci. Food Agr. 17, 215-219. "The phenolic substances of grapes: The anthocyans of Vitis vinifera, variety Shiraz" C.A. 64(5), 20198 A (1966).

Pigment extracted from Shiraz grape skins was separated into components by paper chromatography and identifications were effected by paper chromatography and other laboratory techniques. 3-glucocides and acylated 3-glucosides were found to be present.

Somers, T.C.--Nature 209, 368-370. "Wine tannins - isolation of condensed flavonoid pigments by gel-filtration."

Wine pigment extracts were separated into components according to their degrees of condensation by column chromatography on Sephadex G-25 dextran gel using 0.1% ethanolic (or methanolic) HCl:Water (60:40 v/v) as a solvent. Spectrophotometric measurements were made at 535-540 and 278 millimicrons wavelength and pigments were characterized by paper chromatography. Data, presented graphically, are discussed and are interpreted.

Yakivchuk, A.P.--Vinodelie i Vinogradarstvo SSSR 26(7), 29-30. "Anthocyans of grape skins" C.A. 66, 8820 X (1967); Bull. O.I.V. 39, 1498, No. 1430 (1966).

Studies of the anthocyanic content of Shasselas rose and Muscat de Hamburg grape skins by the Williams-Taranova technique and by paper chromatography. Paper chromatography showed presence of 70-75% Oenin, 15-17% cyanidin glucoside and 10-15% delphinidin glucoside; Williams-Taronova technique indicated 90-92% glucosides and 8-10% aglucones.

Zamorani, A. and Pifferi, P.G.--Boll. Sci. Chim. Ind. Bologna 24(1), 31-40. "Natural pigments (of wine). IV. Determination of the composition of some anthocyanins" C.A. 65(3), 11297 G (1966).

Anthocyanic pigments of Merlot wine were purified and concentrated by precipitation with basic lead acetate. Two-dimensional chromatograms showed 21 anthocyanins which were characterized by paper chromatography and other laboratory methods.

1967

Chen, L.F. and Luh, B.S.--J. Food Sci. 32(1), 66-74. "Anthocyanins in Royalty Grapes" C.A. 67, 2247 T (1967).

Pigment was extracted from Royalty grapes and was purified by column chromatography. Pigment was resolved into components by one- and two-dimensional paper chromatography; identifications were made by paper chromatography and other laboratory methods. Mono- and diglucosides were found as components.

Fitelson, J.--J. Assoc. Offic. Agr. Chemists 50(2), 293-299. "Paper chromatographic detection of adulteration in Concord grape juice" C.A. 104149 J (1967).

A method for the detection of adulteration of Concord grape juice with other red grape juice and colored Italian grape

skin extract is described in detail. It involves photometric measurement of the optical densities of pigment eluates from aglucone bands resolved by paper chromatography. Lead acetate was used for purification and concentration of pigment prior to hydrolysis to form the aglucones.

Mattick, L.R., Weirs, L.D., and Robinson, W.B.--J. Assoc. Offic. Agr. Chemists 50(2), 299-303. "Detection of adulterated Concord juice with other anthocyan-containing products" C.A. 66, 104150 C (1967).

A method is described for the detection of Concord grape juice and wine adulteration with concentrates which are rich in Oenin. Monoglucosides are isolated from other pigment components and impurities and they are resolved into pigment bands; grape juice or wine is applied directly to chromatographic paper and bands are formed by ascending chromatography using distilled water as a solvent. Relative color intensities are then measured with the Analytrol. Data are presented on the total pigment intensities and the relative amounts of monoglucoside components of Concord grape juice samples from various growing areas in the United States.

Somers, T.C.--J. Sci. Food Agr. 18, 193-196. "Resolution and analysis of total phenolic constituents of grape pigment."

A cleaner separation of tannins and resolution of the anthocyan fraction according to its acylation was effected by modifying the previous method (1966) by using a 50% aqueous acetone solution containing 1.5 ml. of conc. HCl per liter as a solvent. Data are presented graphically and are discussed and interpreted.

Valuiko, G.G. and Yvanutina, A.I.--Vinodelie i Vinogradarstvo SSSR 1967(3), 21-25. "Modification of the color of red wines during maturation and aging" Bull. O.I.V. 40, 641, No. 1704 (1967).

(Study of the spectra of red wines has shown that their color depends more on the duration of their storage than on the varietal influence and elaboration procedures. During the maturation and aging of wines the anthocyans undergo a progressive destruction, leaving a preponderant role in the formation of color of old wines to the condensation products from tannic substances.)

Visintini-Romanin, M.--Riv. Viticolt. Enol. 20(2), 79-88. "Studies on the anthocyan pigments of grapes and wines. The oxidation of malvin" Bull. O.I.V. 40, 416, No. 1610 (1967).

(In this note the author explains how, by oxidative degradation of the anthocyans present in hybrid grapes and wines, there is formed only from Malvin a definite compound which is stable and fluorescent, being chromatographically identical with the malvone of Karrer. Different chromatograms obtained with various solvents and developed formulas for malvin and malvone of Karrer illustrate this study.)

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